UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, et al.,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	05-CV-0329 GKF-PJC
	)	
TYSON FOODS, INC., et al.,	)	
	)	
Defendants.	)	

VIDEOTAPE DEPOSITION OF: WILLIAM MICHAEL HANEMANN
May 5, 2009

PURSUANT TO NOTICE, the videotape deposition of WILLIAM MICHAEL HANEMANN was taken on behalf of the Defendant Cargill, Inc., at 1700 Lincoln Street, Suite 3200, Denver, Colorado 80203, on May 5, 2009, at 8:32 a.m., before Marchelle Hartwig, Certified Shorthand Reporter and Notary Public within Colorado.

A P P E A R A N C E S

For the Plaintiff: State of Oklahoma	CLAIRE XIDIS, ESQ. Motley Rice, LLC 28 Bridgeside Boulevard Mt. Pleasant, South Carolina 29464
For the Defendants: Cal-Maine Foods, Inc. and Cal-Maine Farms, Inc.	ROBERT E. SANDERS, ESQ. Young Williams, P.A. 210 East Capitol Street Suite 2000 Jackson, Mississippi 39201 (Appearing Telephonically)
For the Defendants: Cargill, Inc. and Cargill Turkey Production, LLC	COLIN C. DEIHL, ESQ. ERIC J. TRIPLETT, ESQ. Faegre & Benson, LLP 1700 Lincoln Street, Suite 3200 Denver, Colorado 80203
For the Defendant: Peterson Farms, Inc.	CRAIG MIRKES, ESQ. McDaniel, Hixon, Longwell & Acord, PLLC 320 South Boston Avenue Tulsa, Oklahoma 74103 (Appearing Telephonically)
For the Defendant: Simmons Foods, Inc.	BRUCE W. FREEMAN, ESQ. Conner & Winters, LLP 4000 One Williams Center Tulsa, Oklahoma 74172 (Appearing Telephonically)
For the Defendants: Tyson Foods, Inc., Tyson Poultry, Inc., Tyson Chicken, Inc., and Cobb-Vantress, Inc.	JAY THOMAS JORGENSEN, ESQ. Sidley Austin, LLP 1501 K Street, N.W. Washington, D.C. 20005
Also Present:	Davis Baumunk, Videographer William H. Desvousges, Ph.D.

I N D E X

EXHIBIT DISPOSITION:

Original Exhibits: With transcript

WHEREUPON, the following proceedings were taken pursuant to the Federal Rules of Civil Procedure.

08:58:20 * * * * *

09:57:08 THE VIDEOGRAPHER: We are on the record at 8:32 on May 5, 2009, at 1700 Lincoln Street, Denver, Colorado. We are here for the videotaped deposition of Michael Hanemann in the matter of State of Oklahoma, et al., versus Tyson Foods, et al., in the United States District Court, Northern District of Oklahoma. Case No. 05-CV-0329 GKF-PJC.

The videographer is Davis Baumunk. The court reporter is Marchelle Hartwig from Hunter + Geist.

Will counsel please state their appearances, starting with the plaintiff's counsel.

MS. XIDIS: Claire Xidis for the State of Oklahoma.

MR. DEIHL: Colin Deihl for Cargill.

MR. TRIPLETT: Eric Triplett for Cargill.

MR. JORGENSEN: Jay Jorgensen for the Tyson defendants.

MR. MIRKES: Craig Mirkes for Peterson Farms.

MR. SANDERS: Bob Sanders for the

Cal-Maine defendants.

MR. FREEMAN: Bruce Freeman for Simmons on the phone.

THE VIDEOGRAPHER: And will the reporter please swear in the witness.

WILLIAM MICHAEL HANEMANN,

having been first duly sworn to state the whole truth, testified as follows:

MR. DEIHL: Before we get going on the deposition, I had e-mailed Claire and have told others of you that there is a funeral this morning that I need to attend. It's going to be at 10:00 this morning, so I'm going to have to break the deposition at about ten minutes to 10, attend the funeral, and then we'll start up after the funeral.

MS. XIDIS: I'm sorry, I didn't get that e-mail. Do you have an estimated re-starting time or --

MR. DEIHL: Yeah. I estimate it won't take longer than an hour.

MS. XIDIS: Okay.

EXAMINATION

BY MR. DEIHL:

Q. Would you please state your name for the record.

08:34:15 1 A. William Michael Hanemann.
08:34:18 2 Q. Dr. Hanemann, what's your home and work
08:34:22 3 address, please.
08:34:22 4 A. My home address is 209 Gravatt Drive,
08:34:24 5 spelled G-r-a-v-a-t-t, Berkeley, California 94705. My
08:34:35 6 office is in the Department of Agricultural and
08:34:37 7 Resource Economics at the University of California.
08:34:41 8 The mailing address is 207 Giannini Hall, and that's
08:34:45 9 spelled G-i-a-n-n-i-n-i, Berkeley, California 94720.
08:34:54 10 Q. And what are your home and work telephone
08:35:01 11 numbers, please.
08:35:01 12 A. My home telephone number is 510-841-6443
08:35:09 13 and my work telephone is 510-642-2670.
08:35:16 14 Q. Have you been deposed before,
08:35:18 15 Dr. Hanemann?
08:35:20 16 A. Yes.
08:35:20 17 Q. Approximately how many times?
08:35:22 18 A. Three times.
08:35:26 19 Q. If you could describe the nature of those
08:35:28 20 three depositions, please. In other words, what the
08:35:31 21 case was about.
08:35:35 22 A. The first time, and it was a series of
08:35:39 23 maybe 19 days of deposition, was in the American
08:35:43 24 Trader case involving an oil spill by a vessel called
08:35:48 25 the American Trader off Huntington Beach in 1990, and

the case went to trial in the fall of 1997. And I think the depositions were in 1996 and 1997. I was the economic expert for the State of California, which was the plaintiff.

The second time, and I think I was deposed, was the State of Montana suing Arco in connection with pollution contamination in Upper Clark Fork River and I was a rebuttal expert in economics for the State of Montana. And I forget the date, but I think that would have been around 1996.

The third time was, I think, 2005. The State of California had been sued by Chrysler-Plymouth and other automobile manufacturers in connection with its law limiting setting emission standards for greenhouse gases in California, and I was the economic expert for the State of California, and I was deposed in connection with that litigation.

Q. In the American Trader case, did you conduct a contingent valuation survey?

A. No, I didn't conduct an original valuation study of any sort.

Q. Who were you retained by in the American Trader case?

A. The California Attorney General.

Q. Who were the attorneys involved in that

08:37:43 1 case --
08:37:45 2 A. Oh, gosh.
08:37:45 3 Q. -- on behalf of the State of California?
08:37:46 4 A. You know, I become forgetful with names
08:37:50 5 and I can't remember. So there was an attorney out of
08:38:00 6 the attorney general's office in Los Angeles, and I'm
08:38:01 7 embarrassed I can't remember her name, who I've known
08:38:03 8 for a long time. Sylvia, and there was an outside
08:38:09 9 counsel, a small law firm in Los Angeles and Michael
08:38:13 10 Lesley was the attorney.
08:38:20 11 Q. What did you do to prepare for your
08:38:20 12 deposition here this morning?
08:38:24 13 A. I read the expert reports, that's the two
08:38:30 14 reports, and I read the transcripts of the depositions
08:38:39 15 of the other members of my team, although I only
08:38:45 16 received Barbara Kanninen's deposition yesterday, and
08:38:46 17 so I skimmed it very briefly. And I reviewed some
08:38:54 18 related documents like the NOAA guidelines. I guess
08:39:01 19 that was the main one.
08:39:03 20 Q. Did you discuss the deposition with
08:39:07 21 counsel for the State of Oklahoma?
08:39:09 22 A. Yes.
08:39:11 23 Q. Who did you discuss the deposition with?
08:39:13 24 A. I discussed it with Claire and with
08:39:16 25 Ingrid Moll.

08:39:20 1 Q. When did you have that discussion?
08:39:22 2 A. I had those discussions yesterday and on
08:39:26 3 Sunday.
08:39:31 4 Q. Are you on any sorts of medication that
08:39:35 5 would make it difficult for you to be deposed today?
08:39:37 6 A. No. I have a cold, and I will be
08:39:43 7 careful, because if I blow my nose the wrong way it
08:39:45 8 will deafen everybody from this microphone, but I'm
08:39:50 9 not on medication that should incapacitate me from
08:39:54 10 doing this deposition.
08:39:54 11 Q. Have you ever testified before in a court
08:40:01 12 of law?
08:40:01 13 A. Yes.
08:40:01 14 Q. Approximately how many times?
08:40:05 15 A. Three times.
08:40:07 16 Q. What was the nature of that testimony?
08:40:11 17 A. Well, I was an expert witness in the
08:40:15 18 trial of the American Trader case in the fall of 1997.
08:40:20 19 Actually, before that I testified in a water rights
08:40:26 20 hearing in California before the State Water Resources
08:40:28 21 Control Board acting in its judicial capacity in
08:40:31 22 connection with the Mono Lake case. I testified about
08:40:35 23 a valuation study, series of valuation studies I had
08:40:39 24 performed as a consultant to the staff of the state
08:40:41 25 board.

And I testified two or three weeks ago in Australia as an economic expert on a valuation issue for the respondent in a hearing before the Australian Copyright Tribunal in which the issue was an application by the Australian recording industry for a very substantial increase in the royalties paid by fitness clubs in Australia for the use of protected recorded music in fitness classes.

Q. Any other times that you've testified in court?

A. No.

(Deposition Exhibit 1 was marked.)

Q. Dr. Hanemann, I have handed you a deposition exhibit that's been marked as Deposition Exhibit No. 1. Can you identify this document for me?

A. That's my curriculum vitae as of December last year.

Q. Is this CV updated through today or are there additional items you would add to this CV?

A. It's not updated. The last section starting somewhere, starting on page 23 lists Presentations, and the last presentation was one in November 2008, and since then I have probably given half a dozen presentations and I have at least one more report, working paper, in addition, of course, to

08:42:45 1 the reports that I put out in this case.
08:42:48 2 Q. What's the additional working paper that
08:42:50 3 needs to be documented?
08:42:50 4 A. Well, the one I remember offhand is a
08:42:52 5 major study on the Economic Impacts of Climate Change
08:43:01 6 on Urban and Agricultural Water Uses in California,
08:43:03 7 which was kind of a series of reports done for the
08:43:07 8 State of California on the impacts of climate change,
08:43:09 9 and there was -- that report was completed in January.
08:43:15 10 Q. Any others that you can recall?
08:43:18 11 A. No, not that I can recall. Actually,
08:43:28 12 there probably is another paper. There was a World
08:43:30 13 Congress or some such title in England in choice
08:43:35 14 modeling at the beginning of April, and together with
08:43:39 15 a former student, I presented a paper that would have
08:43:45 16 been completed after this date on discrete/continuous
08:43:48 17 corner solution models.
08:44:01 18 Q. How did you come to be hired as an expert
08:44:03 19 witness in this case?
08:44:07 20 A. I was contacted by David Chapman and
08:44:13 21 asked to work on the case.
08:44:15 22 Q. When did you first begin doing work
08:44:16 23 related to the Illinois River Watershed?
08:44:20 24 A. In August 2006.
08:44:22 25 Q. What were you asked to do at that point

08:44:26 1 in time?
08:44:26 2 A. I was asked to join the team that worked
08:44:31 3 on the study; the team which is the coauthor of the
08:44:35 4 report Chapman, et al.
08:44:37 5 Q. What was your understanding of what the
08:44:37 6 team was charged with doing?
08:44:43 7 A. The team was -- let me give you correct
08:44:43 8 language. "The team was commissioned to investigate
08:45:01 9 natural resource damages in Oklahoma associated with
08:45:05 10 the runoff and leachate of poultry waste into the
08:45:07 11 Illinois River system and Tenkiller Lake, based on the
08:45:11 12 state's injury studies." The team was asked to
08:45:13 13 conduct the investigation within the overall framework
08:45:15 14 of a national resource damages estimate.
08:45:18 15 Q. What page are you reading from?
08:45:18 16 A. That's page 1.3 -- 1-3. Section 1.3.1.
08:45:33 17 Q. Prior to being retained in August of
08:45:37 18 2006, had you ever worked with any of the other team
08:45:41 19 members?
08:45:43 20 A. Yes.
08:45:45 21 Q. Whom?
08:45:48 22 A. I had worked with all of them at one time
08:45:50 23 or another.
08:45:54 24 Q. Are you currently working with Stratus on
08:46:01 25 any other projects?

08:46:03 1 A. No.
08:46:05 2 Q. Are you currently working with any of the
08:46:05 3 other team members on any other projects?
08:46:11 4 A. No.
08:46:15 5 Q. Approximately how many other contingent
08:46:16 6 valuation surveys have you been involved with?
08:46:24 7 A. I think approximately eight major studies
08:46:30 8 in which I was the investigator or the coinvestigator,
08:46:35 9 and then there is a large number of studies that I
08:46:39 10 have been asked to comment on in one way or another
08:46:43 11 over the years.
08:46:45 12 Q. What were the contingent valuation
08:46:48 13 studies that you have been involved with?
08:46:50 14 A. Let me make a list so I get this right.
08:46:52 15 I'm forgetting one, which will come back to me. One
08:47:31 16 was a study done valuing the effects of -- valuing
08:47:43 17 reduction in visibility in the Four Corners area, and
08:47:46 18 I think the client was the Salt River Project.
08:47:52 19 A second was the study of the -- valuing
08:48:00 20 the impacts of the Exxon Valdez oil spill for the
08:48:03 21 State of Alaska.
08:48:07 22 Third was a study done for the
08:48:07 23 Interagency Drainage Program in California valuing
08:48:13 24 wetlands contaminated drainage, which was affecting
08:48:20 25 wildlife and the restoration of fish in the San

08:48:24 1 Joaquin River.
08:48:26 2 A fourth one was a contingent valuation
08:48:28 3 study valuing public trust values in Mono Lake.
08:48:35 4 The fifth one was a study valuing oil
08:48:39 5 spills along the central coast of California for the
08:48:45 6 State of California.
08:48:46 7 A sixth one was a study valuing the
08:48:50 8 impacts of quarrying in Italy with some Italian
08:48:54 9 colleagues.
08:49:00 10 And another one is a study valuing oil
08:49:07 11 spills off the coast of Spain for the Spanish
08:49:13 12 government.
08:49:13 13 Q. Weren't you also involved in the --
08:49:15 14 what's known as the Montrose study?
08:49:18 15 A. Yes, I was. I knew I was missing one,
08:49:20 16 and I'm afraid I'm famously absentminded. That's the
08:49:24 17 one I couldn't think of, yes.
08:49:26 18 Q. What was the Montrose study about?
08:49:28 19 A. That was valuing PCB and I think DDT
08:49:30 20 pollution in -- off the coast of Los Angeles for the
08:49:41 21 State of California.
08:49:48 22 Q. With respect to these eight studies, did
08:49:54 23 they all involve both use and nonuse values?
08:50:05 24 A. No.
08:50:07 25 Q. Which ones involved both use and nonuse

values?

A. In Mono Lake, there were two separate studies. The contingent valuation looked at nonuse values by the statewide population and there was a separate recreation study looking at recreation -- recreational uses of Mono Lake, which are on a much more standard by a local population.

With the Exxon Valdez, the survey that we did was a -- the contingent valuation survey was a total value, but that would have been a minute recreation component at most.

Separately I did benefits transfer from a recreation study; that is, from a study of sportfishing in Alaska that I had conducted a few years earlier.

Q. Those are the two, the Mono Lake and the Exxon Valdez?

A. Well, all of the CV studies were total value studies. Actually, the studies in the San Joaquin Valley that I alluded to, again, the contingent valuation covered statewide population that was total value. Then there was a separate much smaller study done of recreational uses, which, again, were mainly local population.

Q. In the Mono Lake study, why did you

choose to do two studies; one that looked at nonuse values and a separate study looking at recreational use?

A. Because recreational occurs -- involves a small subset of the population of the State of California, and it would have been inefficient and I think ineffective to combine them in one study.

Q. Why would it have been inefficient and ineffective?

A. It would have required two different -- very different sampling plans, so it would have essentially -- the sampling plan, which was efficient for a total value study was not efficient for a recreation study, and so this was a case where you can't kill two birds with one stone. You need two separate stones.

Q. Why did you choose to do a separate recreation study?

A. Well, that was part of a suite of studies. I also did studies of impacts on water supply and my colleague did studies of impacts on hydropower generation, so the overall context here was balancing all the beneficial uses associated with Mono Lake and the tributary streams that fed Mono Lake.

Q. Did any of these eight studies involve

08:54:35 1 past damages?
08:55:03 2 A. I think all involved current damages.
08:55:09 3 Many of them were associated with oil spills, and the
08:55:13 4 study was being done immediately following the oil
08:55:18 5 spill. That's true of Exxon and the California -- the
08:55:26 6 Spanish study. The California study was not following
08:55:30 7 a specific oil spill. It was meant to value an -- the
08:55:37 8 effects of oil spills that might occur.
08:55:45 9 And then in the other context such as
08:55:48 10 Mono Lake, the emphasis was on the beneficial uses,
08:55:52 11 both water supply but also recreation and public trust
08:56:03 12 and the balancing of those sort of currently at a
08:56:09 13 given period of time, so that issue didn't arise.
08:56:15 14 Q. So if I understood your answer, was it
08:56:16 15 that none of these studies involved past damages?
08:56:22 16 A. I actually forget what we did in
08:56:26 17 Montrose, and I think that was an element of past
08:56:28 18 damages there. But in the others, these were
08:56:31 19 essentially current damages or -- current damages or
08:56:37 20 at least valuing current flows of services.
08:56:41 21 Q. Didn't Mono Lake also involve alleged
08:56:45 22 past injuries?
08:56:45 23 A. No, because this wasn't a matter of
08:56:48 24 compensation for injuries. This was a matter of
08:56:54 25 whether the state should restrict water rights in

order to provide a better balancing of the beneficial uses, so the focus was essentially the current flow of services to water supply versus public trust services.

Q. What was your involvement in the Montrose CV study?

A. I was a member of the research team, and as a member of the research team, I participated in the development of the questionnaire, the testing and refinement of the questionnaire, the analysis of the data once the questionnaire had been implemented, and the writing of the report.

Q. What are the differences between the Montrose study and this study, if any?

A. I would say that they are broadly similar.

Q. I understand from Dr. Bishop that you would not do a past-damage calculation in connection with Montrose; is that true?

MS. XIDIS: Objection to form.

A. If you are stating that there was not any past-damage calculation in Montrose, I'll take your word for it.

Q. (BY MR. DEIHL) No, that's not what I'm stating. What I'm stating is you wouldn't participate in a past-damage calculation in connection with

08:58:48 1 Montrose; is that correct?
08:58:50 2 MS. XIDIS: Objection to form.
08:59:00 3 A. I recall that the team decided not to
08:59:03 4 conduct a past-damage assessment. As with other
08:59:09 5 aspects of the study, the team discussed these items,
08:59:13 6 and in general function by consensus and whatever
08:59:18 7 decision the team made, I certainly would have
08:59:20 8 concurred with it.
08:59:22 9 Q. Who was on that team?
08:59:30 10 A. As I said, I'm famously absentminded and
08:59:33 11 I don't have the report at hand, but there was --
08:59:35 12 well, maybe -- let me just look. It may be cited. I
08:59:39 13 don't know if this has a bibliography. There was
08:59:50 14 Richard Carson, Robert Mitchell, Stanley Pressor, Jon
08:59:54 15 Krosnick, myself, and I forget if Paul Ruud was a
09:00:11 16 member, so I may be missing a name or two.
09:00:16 17 Q. Was Kerry Smith on that team?
09:00:18 18 A. Kerry Smith played a role in the study
09:00:22 19 and maybe he was a coauthor. I don't remember for
09:00:24 20 sure, and Ray Kopp, I guess if I hadn't mentioned
09:00:31 21 Ray's name.
09:00:33 22 Q. You described a moment ago a discussion
09:00:35 23 among the team members regarding past damages. What
09:00:41 24 was the nature of that discussion?
09:00:43 25 A. I don't believe I described a discussion.

I described a conclusion that the team reached, and I don't remember any details of the discussion.

Q. And what was the conclusion that the team reached?

A. You know, I don't have the report at hand. You are stating that there wasn't a past-damage calculation and I assume you are not mischaracterizing that.

Q. That's not what I stated. I asked you: Was a past-damage calculation done?

A. I don't remember is the answer. I'm sorry, I don't remember.

Q. Okay. Sitting here today, you can't remember whether or not you did a past-damage calculation in connection with Montrose?

A. I can't remember what is contained in that report, and the report describes the analyses we performed.

Q. How much did the team spend on the Montrose study; do you recall?

A. I don't think I knew that, so I can't answer the question.

Q. How much were you paid in connection with the Montrose study; do you know?

A. I don't know.

09:01:52 1 Q. I understand that the Montrose study was
09:02:00 2 excluded by the court on relevance grounds; is that
09:02:03 3 your understanding?
09:02:09 4 A. I don't think I knew precisely what took
09:02:13 5 place there and so I have no knowledge.
09:02:18 6 Q. Is it your understanding that the
09:02:20 7 Montrose study was excluded by the court?
09:02:24 8 A. It's my understanding that it was
09:02:26 9 excluded in some manner by the court.
09:02:28 10 Q. And so you never testified in that case
09:02:31 11 in the court proceeding?
09:02:33 12 A. That's correct.
09:02:37 13 Q. Have you prepared a contingent valuation
09:02:39 14 study that has been accepted as expert work by a court
09:02:45 15 of law?
09:02:46 16 A. Yes.
09:02:46 17 Q. Which one?
09:02:48 18 A. The Mono Lake study, which was accepted
09:02:52 19 as a basis and decision -- for the decision by the
09:03:00 20 State Water Resources Control Board.
09:03:01 21 Q. Any others?
09:03:03 22 A. I mentioned I've only been involved in
09:03:07 23 three litigation episodes, and that's the only one
09:03:11 24 which involved conducting a contingent valuation
09:03:16 25 study.

09:03:16 1 Q. You said the Mono Lake was accepted by
09:03:20 2 the water control board?
09:03:22 3 A. Yes, in a water rights hearing in acting
09:03:26 4 as its judicial capacity.
09:03:33 5 Q. Okay. What are you charging per hour in
09:03:37 6 connection with this matter?
09:03:39 7 A. $400, I believe.
09:03:41 8 Q. Is it $400 for everything you do in
09:03:46 9 connection with this case? In other words, is there a
09:03:48 10 distinction between testimony and --
09:03:50 11 A. No. It's the same hourly rate for
09:03:54 12 testifying and for conducting research.
09:04:00 13 Q. Has it remained the same hourly rate
09:04:01 14 since 2006?
09:04:03 15 A. It's remained the same hourly rate on
09:04:05 16 this case, yes.
09:04:07 17 Q. What is your current hourly rate on new
09:04:11 18 matters you take on?
09:04:11 19 A. On new matters it will be $700 an hour.
09:04:15 20 Q. What are your total billings in
09:04:16 21 connection with this matter?
09:04:18 22 A. I don't know.
09:04:18 23 Q. How many hours have you spent on this?
09:04:22 24 A. I don't know.
09:04:28 25 Q. Let's talk about your work on the

09:04:30 1 Illinois River Watershed. What was your role as part
09:04:33 2 of the Stratus team?
09:04:35 3 A. As part of the Stratus team, my role was
09:04:37 4 to participate in the functioning of the Stratus team,
09:04:41 5 and that involved participating in developing the
09:04:45 6 survey instrument, designing the study, which included
09:04:50 7 developing the survey instrument, testing and refining
09:04:52 8 it, analyzing the data after the survey was
09:05:01 9 implemented and writing the report.
09:05:03 10 (Deposition Exhibit 2 was marked.)
09:05:37 11 Q. Dr. Hanemann, I've handed you what's been
09:05:39 12 marked for purposes of identification as Deposition
09:05:41 13 Exhibit No. 2, which are selected pages from National
09:05:48 14 Resource Damage Assessment, Inc., September 1994
09:05:52 15 report entitled "Prospective Interim Lost Use Value
09:05:52 16 Due to PCP and DDT Contamination in the Southern
09:06:03 17 California Bight." You have seen this document
09:06:05 18 before, haven't you?
09:06:07 19 A. Yes.
09:06:11 20 Q. And this document is listed on your
09:06:15 21 curriculum vitae, correct?
09:06:18 22 A. Yes.
09:06:24 23 Q. My understanding is that this study is
09:06:26 24 the one that's commonly known as the Montrose study;
09:06:28 25 is that correct?

09:06:28 1 A. Yes.
09:06:31 2 Q. Now, if you would take a look at the
09:06:33 3 Table of Contents and the various sections that are
09:06:37 4 listed here to refresh your recollection and then tell
09:06:41 5 me what the differences are in methodology between the
09:06:45 6 Montrose study and study that you did in connection
09:06:48 7 with the Illinois River Watershed.
09:06:54 8 A. Well, it's been a long time since I
09:07:03 9 looked at my copy of the report, and I actually, as I
09:07:05 10 have indicated, don't remember all the details. What
09:07:11 11 I'm struck by is the similarities between the two
09:07:15 12 reports and the two types of analyses.
09:07:20 13 Q. Any differences that jump out at you?
09:07:22 14 A. No.
09:07:24 15 Q. Okay. In connection with the project
09:07:52 16 that brings us here today, the Illinois River
09:08:00 17 Watershed project, what tasks did you take the lead
09:08:03 18 on, if any?
09:08:09 19 A. I don't think I took the lead on any
09:08:11 20 tasks.
09:08:18 21 Q. How was the team selected for the
09:08:20 22 Illinois -- for this project?
09:08:24 23 A. I don't know.
09:08:24 24 Q. You didn't do the selecting?
09:08:28 25 A. I didn't do the selecting.

09:08:31 1 Q. What expertise did you feel you brought
09:08:33 2 to the team?
09:08:39 3 A. I am recognized internationally as one of
09:08:41 4 the leading experts around the world in nonmarket
09:08:45 5 valuation. I have made major contributions to the
09:08:50 6 methodologies used by economists for nonmarket
09:08:52 7 valuation, and I have participated in I think what are
09:09:01 8 regarded as landmark studies in both stated and
09:09:05 9 revealed preference, so I assume that accumulated
09:09:09 10 experience was something I could contribute to the
09:09:15 11 team.
09:09:16 12 Q. What's your understanding of what
09:09:16 13 expertise Dr. Bishop brought to the team?
09:09:22 14 A. Dr. Bishop is also very well known as an
09:09:30 15 environmental resource economist. He, like I, is a
09:09:35 16 fellow of the Association of Environmental & Resource
09:09:41 17 Economists, and there is I think fewer than 20 such
09:09:46 18 fellows at this point. He is experienced in many
09:09:50 19 aspects of environmental resource economics. In
09:10:01 20 particular, he has a large amount of experience in
09:10:07 21 contingent valuation. He did -- I guess between the
09:10:13 22 two of us, we put the closed-ended format on the map,
09:10:16 23 and that's the format that was endorsed by the NOAA
09:10:20 24 panel. He did the first such study in 1979, and in
09:10:28 25 1984 I published a landmark article explaining the

economic logic of the study and how to analyze it. So Dr. Bishop has tremendous experience.

Another thing is, he has worked a lot on various aspects of fisheries management and water resource issues in the Midwest and elsewhere, and had, I think, a deep understanding of fisheries and water quality issues, a deeper understanding of the technical matters than I have and that I think other members of the team have, so he brought a variety of skills and a large amount of expertise.

Q. How about Dr. Krosnick, what expertise did he bring to the team?

A. Oh, Jon Krosnick is one of maybe three or four leading experts in the world on survey design. Roger Tourangeau is another of that very small group. These are world leaders in various aspects of survey design.

Roger, if I -- has particular expertise in what's called cognitive survey development, which is recognized now as the state-of-the-art method, the standard method for developing a survey, and Roger helped put that on the map in the 1980s. Roger is also a world-class sampling statistician and expert on the sample design, sample selection, sample size and so on. He teaches -- he consults with many agencies,

but is a major figure advising the census bureau.

Jon's background -- Jon also has statistical knowledge, but Jon's particular strength is questionnaire wording, interviewer training. Jon and Roger together are world experts in studying attitudes, measuring attitudes, analyzing attitudes in a survey research context.

Q. Now, Dr. Kanninen was brought to the team in the fall of 2008. Do you know why she was brought onto the team?

A. Yes.

Q. Why?

A. Because Dr. Kanninen did her dissertation on what's called bid design. That's a term of art and refers to choosing the monetary values with which respondents are confronted when they make a tradeoff in a closed-ended question format. She is a leading expert in the world on design; that is, choosing monetary values and choosing the aspects of the survey, the quantitative aspects that are selected by the survey researcher in stated preference studies. But beyond that, she is an excellent econometrician, and so her contribution was not just in the bid design, but in the analysis of the data when it came. So she is just an outstanding econometrician with a

lot of expertise in the area of the sort of data generated by this type of survey.

Q. Were you involved in any discussions about whether to bring Dr. Kanninen on board?

A. I don't recall specific discussions, but let me emphasize that's because I don't recall the discussions on many of the topics; that is, I have a lousy memory and lots of things have happened since last August. So I don't recall whether this was discussed in team conference calls or whether it was -- or whether the decision was made and presented to the team. I think it's an excellent decision. I thought it was an excellent decision at the time, but I don't recall the decision process.

Q. What role did Mr. Chapman play on the team?

A. David Chapman was the project leader. He ran this project, as I understand, for Stratus, and as the leader was in contact with the client, the State of Oklahoma, and he also, as the team leader, retained the survey company, Westat, and dealt with them. So he dealt with all of us, with the survey companies, and with the client.

Q. Did you do any work on the recreational intercept survey?

09:16:18 1 A. No.
09:16:20 2 Q. Are you familiar with that survey?
09:16:24 3 A. Loosely.
09:16:26 4 Q. What's your familiarity?
09:16:30 5 A. There is a report which -- that was
09:16:33 6 prepared or a draft report, which -- that was turned
09:16:39 7 over or was part of the documents turned over in
09:16:45 8 December, and I received a copy at that time and
09:16:48 9 skimmed it. And to the extent some of the survey
09:16:52 10 findings were presented to the team in conferences and
09:17:00 11 meetings, I would have heard that presentation.
09:17:07 12 Q. You indicated you received a copy at that
09:17:09 13 time. At what time did you receive a copy?
09:17:11 14 A. Well, so first -- I'm not -- around
09:17:22 15 January the 5th, I received a copy of -- an electronic
09:17:31 16 copy of documents turned over by Stratus and that is
09:17:35 17 in one of the subdirectories. I may also have had a
09:17:39 18 copy prior to then on my own hard drive and I turned
09:17:45 19 over the electronic files I had, and so it either will
09:17:54 20 or won't be. If it's in that file, then I received it
09:18:03 21 sometime earlier.
09:18:03 22 Q. Do you recall reviewing that survey at
09:18:07 23 any time prior to January of this year?
09:18:13 24 A. Do you mean by that reviewing the survey
09:18:15 25 instrument?

09:18:16 1 Q. I mean reviewing the report of the
09:18:18 2 intercept study.
09:18:24 3 A. As I said, there may have been some sort
09:18:28 4 of presentation of the findings from the survey at
09:18:33 5 some point during the course of the study. I have no
09:18:37 6 specific recollection, but that may have occurred. I
09:18:45 7 looked briefly at the report sometime between -- I
09:18:48 8 don't know when, but after early January when I
09:18:52 9 received the electronic files from Stratus.
09:19:00 10 Q. Did the intercept survey report -- strike
09:19:07 11 that.
09:19:07 12 What -- did you use the intercept survey
09:19:11 13 report in any way in putting together the
09:19:15 14 questionnaire for the report in this case?
09:19:16 15 A. "You" singular or "you" plural; that is,
09:19:16 16 me personally or the team?
09:19:22 17 Q. Well, let's start with you personally.
09:19:24 18 A. No.
09:19:26 19 Q. How about the team?
09:19:28 20 A. I don't know.
09:19:33 21 Q. You're aware that there was a telephone
09:19:35 22 survey done?
09:19:37 23 A. Yes.
09:19:37 24 Q. Were you involved in that telephone
09:19:39 25 survey?

09:19:41 1 A. As a member of the team, I would have
09:19:43 2 participated in the discussions that the team had on
09:19:48 3 that topic.
09:19:50 4 Q. Did you have any involvement in writing
09:19:52 5 the report regarding the telephone survey?
09:20:00 6 A. No.
09:20:00 7 Q. Do you know who wrote that report?
09:20:01 8 A. No.
09:20:03 9 Q. What was the purpose of the telephone
09:20:03 10 survey?
09:20:07 11 A. Well, as I recall, the telephone survey
09:20:11 12 was a small exploratory effort, different from but
09:20:18 13 analogous to focus groups that we were holding at that
09:20:20 14 time. And as I recall, a major motivation was the
09:20:31 15 advertising campaign by the poultry industry, I'll
09:20:37 16 say. I'm not sure of the exact organization. We
09:20:43 17 wanted to know -- we wanted to find out or we wanted
09:20:46 18 to see if we could find out what information people
09:20:50 19 were taking away from that -- from the advertisements,
09:21:01 20 because that was relative information, among other
09:21:05 21 things. That is, that would be one piece of relevant
09:21:09 22 information in designing the sort of narrative in the
09:21:15 23 survey instrument.
09:21:20 24 Q. Did you have any involvement in drafting
09:21:22 25 the questions that were used in the telephone survey?

09:21:28 1 A. To the extent they were discussed by the
09:21:31 2 team, I would have participated in those discussions
09:21:33 3 and offered suggestions.
09:21:37 4 Q. Do you recall any discussions about the
09:21:41 5 telephone survey questions?
09:21:45 6 A. I don't recall the specific substance of
09:21:50 7 the team conversations and so on, so I don't recall a
09:21:54 8 specific discussion. By that, I don't mean to imply
09:22:01 9 it didn't concur, but it's a statement. I don't --
09:22:05 10 nothing stands out.
09:22:07 11 Q. How did the team choose the method you
09:22:09 12 used in this case to estimate the monetary value of
09:22:13 13 damages?
09:22:16 14 A. By that you mean a contingent valuation
09:22:18 15 study?
09:22:20 16 Q. Yes. Yes.
09:22:24 17 A. That emerged from team discussions. My
09:22:30 18 own view -- I can only tell you my own view, which was
09:22:33 19 that that was obviously the correct way to proceed and
09:22:41 20 it certainly was the view of the team after it had its
09:22:45 21 discussions.
09:22:45 22 Q. Why do you believe it was, quote,
09:22:46 23 obviously the correct way to proceed?
09:22:48 24 A. Oh, it was obviously the correct way to
09:22:50 25 proceed because I do not believe it is possible to

measure use values reliably through some sort of recreation survey, let alone nonuse values, and so I don't believe it's possible to obtain a reliable estimate even if they use a portion of the damages through a recreational survey that one could conduct at this date.

Q. Why do you believe it's not reliable to measure use values through a recreational survey?

A. I may be misapprehending. What I was saying is I don't believe that it's possible in this case, by that I mean in Oklahoma now, to measure the recreational loss associated with the impairment in the Illinois River system and Tenkiller Lake, so I'm not making a general statement.

Q. But why?

A. For two reasons, two different reasons. One is this is a situation where the major change in water quality occurred some time ago, several decades ago, and that would have changed permanently people's patterns of behavior. People in the 1960s or whenever when the water was of a good quality would have experienced the change over the years and some of them would have given up visiting the site or if they visited, these sites would have changed what activities they did.

09:24:39 1 And so when you come along now, 30, 40
09:24:45 2 years later, the changes occurred long ago in the
09:24:48 3 past, and so you don't pick up from today's recreation
09:24:52 4 as the subset of today's recreation the change in
09:25:00 5 behavior, because the people whose -- in many cases,
09:25:01 6 the people whose behavior changed aren't going to the
09:25:03 7 lake now. That's one thing. That's an issue where
09:25:07 8 you have major changes and you are now attempting to
09:25:11 9 measure the impact on behavior a long period after
09:25:15 10 that, so the nature of the behavior has changed. And
09:25:18 11 from collecting data on today's behavior, you can't
09:25:22 12 usefully infer what the behavior had been. That's one
09:25:28 13 thing.
09:25:28 14 The second set of issues has to do -- the
09:25:33 15 second set of issues has to do with whether, given the
09:25:35 16 set of recreation sites, water-based recreation sites
09:25:41 17 in the state, you would have the type of variation in
09:25:45 18 water quality and other variables which would permit
09:25:48 19 you reliably to measure the effect of the impaired
09:25:54 20 water quality at these particular sites on the people
09:26:01 21 who today participate in water-based recreation in the
09:26:07 22 state. You don't have a set of other sites in the
09:26:11 23 state, which I think give you the right sort of
09:26:15 24 variation that will produce a statistical analysis.
09:26:18 25 So you can do a statistical study today

that would be a bad study, but I don't believe -- and I have done the major studies on travel cost. I developed that methodology. I have done the landmark studies. I don't think it's possible to do a good recreation study that would reliably measure the impact on use values of the impaired water quality at these locations.

Q. What's the basis for your statement that the major changes in water quality at the site occurred several decades ago?

A. I am -- the basis for that statement is the information that the team obtained from the scientists working for the State of Oklahoma.

Q. So you were relying upon those scientists for that understanding?

A. That's correct.

Q. Don't you indicate in your survey that the water quality varies by season and by location in the Illinois River and Tenkiller Lake?

A. That's correct. That's also irrelevant I can say because what matters is the water quality at the time recreationists want to go there, and that's I think when major changes occurred.

Q. That's -- I didn't hear the end of your sentence.

09:27:45 1 A. I think the major changes that we are
09:27:46 2 talking about affect, among other things, time periods
09:27:52 3 when recreational use is -- would be important.
09:28:00 4 Q. And what time periods are those? What
09:28:11 5 document are you referring to?
09:28:13 6 A. This is the -- this is an excerpt from
09:28:15 7 the report. It's the printout of the base
09:28:18 8 questionnaire, so it's pages A-2 -- I just printed
09:28:24 9 this out so it's convenient to look through it, a
09:28:30 10 small document rather than that large one. So, for
09:29:01 11 example, algae in the lake --
09:29:05 12 Q. What page are you looking at?
09:29:07 13 A. I'm sorry. I'm looking at page A-10,
09:29:07 14 excuse me. I'm looking at the second paragraph and
09:29:15 15 it's the third sentence. "This amount of algae is
09:29:18 16 most often seen between March and June." And then
09:29:24 17 going down the page to the last paragraph, "Now in the
09:29:31 18 summer, people can often see down less than 3 feet
09:29:35 19 where the river comes in." So it's the second line of
09:29:39 20 the last paragraph.
09:29:41 21 MR. DEIHL: Could you read back the
09:29:46 22 question, please.
09:30:05 23 (The last question was read back as
09:30:05 24 follows: "And what time periods are those?")
09:30:05 25 A. Let me tell you what I thought the

question was that I was answering. I said that the impairment of water quality affected periods, particularly when recreation would occur, and I thought of that as the late spring and summer, and then I was describing these two statements which talk about impairment during that period.

And, for example, to continue with the last sentence on page A-10, which states that, "In the winter, the water is clearer and people can usually see down about 10 feet." The point I'm making is not that there is no recreation in the winter, but my understanding would be that the summer would be a more important recreation period than the winter.

Q. (BY MR. DEIHL) These statements that you've highlighted on page A-10, your basis for those statements is the natural scientists?

A. Yes.

Q. Do you know what basis the natural scientists had for determining conditions in 1960?

A. The short answer is no.

Q. Who made the decision to use a contingent valuation methodology in connection with this site?

A. The team made that recommendation to the client, and the client had to accept that recommendation and did so.

09:32:03 1 Q. How did you select 1960 as the baseline
09:32:09 2 date?
09:32:13 3 A. That -- so if you look at page A-8 of
09:32:20 4 this base questionnaire, the top two lines state, "In
09:32:24 5 the late 1950s and early 1960s, the water in the river
09:32:31 6 was clear most of the time," and so on. So baseline
09:32:33 7 is actually the late 1950s and early 1960s. And then
09:32:37 8 for -- to keep the wording simple, later on in the
09:32:39 9 questionnaire we say around 1960, but we are referring
09:32:45 10 to that period in the late 1950s and early 1960s.
09:32:54 11 Making that period, I've just referred to
09:33:00 12 the baseline, was a decision based on information that
09:33:05 13 the team received from the natural scientists through
09:33:11 14 their communication with Dr. Richard Bishop as the
09:33:15 15 intermediary.
09:33:18 16 Q. Going back to page A-10, how did you
09:33:22 17 represent the seasonal differences between the amount
09:33:26 18 of algae, say, in March through June and the amount in
09:33:30 19 December in the photographs that were used in the
09:33:35 20 survey?
09:33:37 21 A. I don't have my copy with the
09:33:41 22 photographs, so maybe you could just let me -- well, I
09:33:46 23 think I can answer that. The photographs, which
09:33:50 24 appear on A-42, I believe, and page A-43, the
09:34:03 25 photographs show -- let's say A-43 how the lake used

09:34:07 1 to look and how the lake sometimes looks and then
09:34:09 2 there is the text, which describes the seasonal -- the
09:34:13 3 seasonality. For example, a little algae on the
09:34:20 4 bottom of the -- I'm sorry. Now between March and
09:34:24 5 June there is more algae. During the summer there is
09:34:26 6 more algae and so on.
09:34:30 7 Q. Okay. So you would refer to page A-43 to
09:34:33 8 demonstrate how you represented these seasonal
09:34:35 9 differences in the photographs?
09:34:37 10 A. Yes, and let me emphasize there are two
09:34:41 11 cards on page A-43, both of which were shown to
09:34:43 12 respondents, card G, which is the photographs, and
09:34:46 13 then Card H, which has the text that I just read.
09:34:54 14 Q. Did you discuss the selection of the
09:35:01 15 contingent valuation methodology with the attorneys?
09:35:05 16 A. It was a recommendation of the team, and
09:35:13 17 the recommendation was presented to the attorneys and
09:35:18 18 they may have asked the reasons for the recommendation
09:35:22 19 and we would have stated those reasons. I mean, the
09:35:26 20 team would have stated them.
09:35:26 21 Q. Sitting here today, do you recall a
09:35:28 22 discussion with the attorneys about this?
09:35:31 23 A. I think there was -- I think the
09:35:35 24 attorneys attended a meeting in Boulder. I don't
09:35:39 25 remember when. And as I say, we talked -- the team

talked about its recommendation, but I don't recall the specifics. I don't recall anything more specific than what I have just told you, the general sort of outline or the general content of the meeting.

Q. Okay. So this meeting was in Boulder. Which attorneys attended?

A. You know, I can't remember.

Q. Do you remember anything more specific than what you have just described?

A. No.

Q. Did you consider using other estimation methods?

A. I'm not sure what other estimation methods you are thinking of. In other words, I'm not sure.

Q. Well, for example, habitat equivalency?

A. I don't recall somebody suggesting that. My own opinion is that would be a completely inappropriate method to use, but I don't recall a discussion in which that was -- in which I was present in which that was suggested.

Q. So you don't recall a discussion about any other valuation methodologies?

A. No.

Q. Taking a look at the report for a moment,

09:37:28 1 just sort of skimming it, describe for me the steps
09:37:37 2 you took to arrive at what we now view as the report.
09:37:43 3 What did you do first? What did you do second? How
09:37:46 4 did you proceed?
09:37:46 5 MS. XIDIS: Objection to form.
09:37:48 6 A. Are you referring to the writing up --
09:37:52 7 the writing phase as opposed to sort of the testing?
09:38:00 8 Q. (BY MR. DEIHL) Thank you for that
09:38:00 9 clarification. No. I'm referring to what you and the
09:38:03 10 team did to arrive at the conclusions that are
09:38:07 11 reflected in the report.
09:38:11 12 MS. XIDIS: Objection to form.
09:38:11 13 A. Well, I take that as a question -- a
09:38:16 14 broad question, and to -- the answer is that we
09:38:24 15 proceeded to develop and test a survey instrument and
09:38:31 16 field the survey. We had a deadline for the delivery
09:38:37 17 of our final report that was set. I don't know when,
09:38:41 18 but maybe 18 months earlier on, but that's just a
09:38:48 19 guess. I don't remember the specific time. So we
09:38:50 20 were working within a framework, but on the other
09:38:52 21 hand, we didn't want to field the survey until we were
09:39:01 22 completely satisfied with it.
09:39:03 23 We knew there would be a limited amount
09:39:05 24 of time to analyze the data and write the report, and
09:39:11 25 so steps were taken to both prepare the data analysis

09:39:18 1 and to pave the way for the writing of the report
09:39:22 2 while the survey was still in the field so the data
09:39:24 3 analysis could be conducted within the limited time as
09:39:31 4 the data came in and the report could be composed
09:39:37 5 within the given time frame.
09:39:41 6 Q. (BY MR. DEIHL) How did you go about
09:39:43 7 developing and testing the survey instrument? First,
09:39:46 8 let me ask the first question. How did you go about
09:39:48 9 developing the survey instrument?
09:39:52 10 A. That's described in this report, so . . .
09:40:13 11 Well, development took place between October 2006 and
09:40:18 12 August 2008 reading from page 3-1, and it involved a
09:40:26 13 series of steps, including focus groups, one-on-one
09:40:33 14 interviews, pretests, and pilot tests.
09:40:41 15 Q. How did you arrive at the factual
09:40:48 16 information that was included in the survey
09:40:52 17 instrument?
09:41:00 18 A. Now, by factual information, I should
09:41:05 19 make a distinction between two sets of facts that are
09:41:11 20 presented in the instrument. One is a set of facts
09:41:15 21 regarding the injury. A second is a set of facts
09:41:20 22 regarding the mechanism by which the injury can be
09:41:24 23 eliminated; that is the alum program.
09:41:26 24 The facts regarding the injury came from
09:41:30 25 the natural scientists working for the state,

09:41:31 1 essentially through Dr. Bishop, the mechanism by which
09:41:45 2 the injury could be eliminated or which recovery could
09:41:52 3 be accelerated, but through a method that created a
09:42:00 4 cost for respondents. That's something that the team
09:42:05 5 largely put together based partly on information we
09:42:11 6 had obtained about the use of alum as part of lake
09:42:18 7 restoration programs. But as I have emphasized,
09:42:20 8 that's a separate set of facts which plays a very
09:42:24 9 different role in the survey and in the study from the
09:42:28 10 facts about the injuries.
09:42:37 11 Q. Why did you include passive users as part
09:42:41 12 of the same relevant population as active users?
09:42:46 13 A. We looked at the entire population of
09:42:52 14 Oklahoma, except for the western counties, and we
09:43:01 15 wished to develop an estimate of the willingness to
09:43:07 16 pay of Oklahomans, Oklahoman households living within
09:43:15 17 the state except for that western region, and so we
09:43:18 18 wanted a representative sample which would give us a
09:43:24 19 valid summary statistic such as a mean or an estimate
09:43:30 20 of the mean for that population and -- for the
09:43:33 21 population viewed as a group as an entire whole.
09:43:39 22 MR. DEIHL: I'm going to have to break
09:43:41 23 this deposition to attend a funeral. I will be back
09:43:45 24 as soon as I can. I don't anticipate it will take
09:43:46 25 more than an hour, but I will be back as soon as I

09:43:50 1 can. I appreciate your accommodation.
09:43:52 2 THE VIDEOGRAPHER: Going off the record.
09:43:52 3 The time is 9:44.
10:00:11 4 (Recess taken, 9:44 a.m. to 11:30 a.m.)
11:30:05 5 THE VIDEOGRAPHER: Back on the record.
11:30:20 6 The time is 11:30.
11:30:22 7 Q. (BY MR. DEIHL) Dr. Hanemann, before we
11:30:30 8 took a break, we were talking about what you did to
11:30:33 9 develop and test the survey documents in this matter,
11:30:37 10 and we were talking about the work that Dr. Bishop had
11:30:46 11 done to interact with the natural scientists. Did you
11:30:52 12 yourself attempt to learn as much as you could about
11:31:00 13 the Illinois River and the Illinois River Basin for
11:31:03 14 purposes of putting together the survey documents?
11:31:11 15 A. No. There are two parts to that. I, at
11:31:15 16 the beginning of my involvement, looked around for
11:31:18 17 readings about the Illinois River, but that was to
11:31:22 18 familiarize myself with the general setting.
11:31:26 19 In terms of developing the instrument, I
11:31:30 20 didn't look for additional information about the
11:31:35 21 injury or whatever. All of that information came
11:31:39 22 from -- all of the information on the injury came
11:31:41 23 through Dr. Bishop.
11:31:45 24 Q. At the beginning of the process when you
11:31:46 25 looked at information to familiarize yourself with the

river, what did you learn during that process?

A. That it was a scenic river; that it was a scenic area.

Q. Anything else?

A. That's the main conclusion that I recall.

(Deposition Exhibit 3 was marked.)

MS. XIDIS: Could I get a copy of that, please?

MR. DEIHL: Sorry.

Q. (BY MR. DEIHL) Dr. Hanemann, I have handed you what's been marked for purposes of identification as Deposition Exhibit No. -- I believe it's 2; is that correct?

MS. XIDIS: 3.

Q. (BY MR. DEIHL) 3, thank you. Deposition Exhibit No. 3, which is a document at the top it's labeled "Memo on the Logic of the Discussion Guide to be Used for Focus Groups." Do you have that in front of you?

A. I have it in front of me, yes.

Q. And I'll represent to you that this came out of your considered-by materials, and in the computer it was labeled "Rationale for Scenario Construction." Have you seen this document before?

A. I don't recall seeing or reading this

document.

Q. How did materials end up in your considered-by documents?

A. They -- I suppose mainly in two ways. One is materials I myself accessed in some manner created or downloaded. And the other would be attachments to e-mails or things which were sent to me and so they got archived under -- in the file for this study.

Q. Do you know where this document came from?

A. No.

Q. Do you know whether you created it?

A. I don't -- so I personally don't recall participating in the writing of this document, but it's not -- it doesn't ring a bell to me, so I don't know anything about it.

Q. The first paragraph of this document states, "The goal of this scientific effort is to measure the existence value of a public good through a contingent valuation survey, which entails multiple steps." Do you see that?

A. Yes.

Q. And if you look a little further on in the document, for example, in the bottom paragraph on

11:35:13 1 the first page, there is a reference to Oklahoma and
11:35:16 2 measuring damage done to rivers, a lake, and
11:35:20 3 groundwater in Oklahoma?
11:35:22 4 A. Yes.
11:35:24 5 Q. So it appears that this document is
11:35:26 6 related to the contingent valuation survey that you
11:35:30 7 and the team conducted with respect to the Illinois
11:35:33 8 River. Would you agree with me on that point?
11:35:37 9 A. This document describes a proposal to
11:35:41 10 conduct a contingent valuation survey, and we did, as
11:35:46 11 described in this report, conduct a contingent
11:35:50 12 valuation survey, but I know nothing about the
11:35:54 13 connection between these two. Do you know the date of
11:36:01 14 this document?
11:36:05 15 Q. You know --
11:36:07 16 A. I mean or year.
11:36:09 17 Q. I do know the date and I don't have it
11:36:11 18 readily available right now, but I will find out.
11:36:15 19 A. As I say, the document doesn't ring a
11:36:16 20 bell and doesn't look familiar. I wonder if it's an
11:36:24 21 early -- whether it's a document that predates
11:36:30 22 August 2006, which is when I joined the team. But,
11:36:35 23 anyhow, it doesn't look familiar to me.
11:36:39 24 Q. The first step listed in this document
11:36:41 25 is, "The investigators gain familiarity with the

11:36:45 1 nature of the public good." Would you agree that that
11:36:46 2 is a step that one takes in conducting a thorough
11:36:50 3 contingent valuation survey?
11:36:54 4 A. Yes.
11:37:00 5 Q. And in this case, how did you go about
11:37:01 6 gaining familiarity with the nature of the public
11:37:05 7 good?
11:37:13 8 A. I and other members of the team made a
11:37:16 9 site visit to this area and saw many of the locations
11:37:28 10 and also some of the natural scientists, so we
11:37:39 11 received presentations from some of the natural
11:37:43 12 scientists working for the state, both at a meeting,
11:37:46 13 but also some of them accompanied on the site visit,
11:37:50 14 so presented information during the site visit.
11:38:00 15 And then on a continuing basis, we
11:38:05 16 received information through Dr. Bishop from the
11:38:09 17 scientists, and I think there was more than one
11:38:13 18 meeting at which the scientists conveyed information
11:38:18 19 in the course of my participation on the team.
11:38:26 20 (Deposition Exhibit 4 was marked.)
11:38:39 21 Q. Dr. Hanemann, I've handed you what's been
11:38:41 22 marked as Deposition Exhibit No. 4, which is another
11:38:45 23 document that came out of your considered-by
11:38:48 24 materials. It appears to be some pages from the
11:38:50 25 Oklahoma Travel Handbook if you look at the third page

11:38:54 1 of this document.
11:38:54 2 A. Yes.
11:39:00 3 Q. Do you know why this document was in your
11:39:01 4 considered-by materials?
11:39:03 5 A. Yes. I purchased a copy of the Oklahoma
11:39:05 6 Travel Handbook -- this was early in my involvement --
11:39:09 7 to acquire information about Oklahoma, and I
11:39:15 8 photocopied the section of the handbook dealing with
11:39:18 9 the Illinois River.
11:39:20 10 Q. Was this part of your effort to gain
11:39:24 11 familiarity with the site?
11:39:26 12 A. Yes. This was done at the very beginning
11:39:30 13 of my involvement I think before I had actually been
11:39:33 14 out to visit, but it was part of my efforts to gain
11:39:41 15 some familiarity with the site.
11:39:48 16 Q. Taking a look at the first page of
11:39:52 17 Exhibit No. 4, there is a section on the Illinois
11:40:01 18 River. Do you see that?
11:40:03 19 A. That's right.
11:40:05 20 Q. Would you read into the record, please,
11:40:09 21 the section -- the first sentence of that section on
11:40:13 22 the Illinois River.
11:40:13 23 A. I will. Before I do so, let me say I'm
11:40:16 24 not sure what the date of this book is. I have a
11:40:24 25 recollection, but it may not be prior to this book;

11:40:28 1 that what I got was a secondhand copy and so the book
11:40:31 2 was old at the time I got it. But the sentence that
11:40:35 3 you refer to reads "Oklahoma's favorite river in many
11:40:37 4 ways."
11:40:41 5 Q. And then down below that there is a
11:40:43 6 sentence that reads, "It is a free-flowing and highly
11:40:46 7 scenic stream."
11:40:48 8 A. That is correct.
11:40:50 9 Q. Then if you would go over to the next
11:40:52 10 column and read the first sentence in that next
11:41:01 11 paragraph, please.
11:41:01 12 A. "The Illinois is perhaps the state's best
11:41:07 13 single fishing stream."
11:41:09 14 Q. And the next sentence, please.
11:41:09 15 A. "Nearly every game fish found in Oklahoma
11:41:13 16 can be taken from its waters."
11:41:13 17 Q. Thank you.
11:41:16 18 A. Let me just repeat. It certainly came
11:41:20 19 out after 1970, because it refers to the designation
11:41:24 20 in 1970, but I'm not sure that it came out long after
11:41:31 21 that date.
11:41:31 22 (Deposition Exhibit 5 was marked.)
11:41:43 23 Q. Dr. Hanemann, I've handed you what's been
11:41:45 24 marked as Deposition Exhibit No. 4, which I believe --
11:41:48 25 A. 5.

11:41:50 1 Q. I'm sorry, 5. Thank you. I'm off by one
11:41:52 2 all day today. Deposition Exhibit No. 5, which I
11:42:00 3 believe are additional pages from this Oklahoma Travel
11:42:01 4 Handbook. Is that what it appears like to you as
11:42:05 5 well?
11:42:05 6 A. Yes, indeed.
11:42:07 7 Q. And these, again, were in your
11:42:07 8 considered-by materials and you would have looked at
11:42:11 9 them for the same purpose, I take it?
11:42:13 10 A. Yes.
11:42:13 11 Q. Okay. Directing your attention to page
11:42:16 12 221 of this document, if you could read into the
11:42:24 13 record, please, the first sentence under the heading
11:42:28 14 "Tenkiller Reservoir."
11:42:33 15 A. I'm sorry. Oh --
11:42:35 16 Q. And starting with the word "Among."
11:42:37 17 A. "Among Oklahoma's most scenic, this
11:42:46 18 12,650-acre lake was formed in 1953 with construction
11:42:52 19 by the U.S. Corps of Engineers of the Tenkiller Ferry
11:43:00 20 Dam."
11:43:01 21 Q. And then if you turn to the second page,
11:43:05 22 there is a reference to Tenkiller State Park.
11:43:09 23 A. Yes.
11:43:09 24 Q. And if you would read the first sentence
11:43:11 25 of that section.

11:43:13 1 A. "One of the state's better-known fishing
11:43:16 2 areas, this 1,190-acre preserve sits beside a
11:43:18 3 pleasantly scenic cove of 12,500-acre Tenkiller
11:43:24 4 Reservoir."
11:43:26 5 Q. Thank you. As you conducted this survey
11:43:39 6 of respondents regarding Tenkiller Lake and the
11:43:41 7 Illinois River, how did you assure that the
11:44:00 8 information you were providing to the respondents in
11:44:01 9 the surveyed documents was factually accurate?
11:44:07 10 A. As I've mentioned before, it's important
11:44:09 11 to distinguish the two sorts of information;
11:44:11 12 information about the injury and information about the
11:44:16 13 mechanism that made it possible to eliminate the
11:44:18 14 injury at a cost.
11:44:22 15 With regard to information about the
11:44:26 16 injury, we -- the steps we took to assure the accuracy
11:44:35 17 of this information was both to collect information
11:44:39 18 from the scientists working for the state, the natural
11:44:43 19 scientists, and also to ask them to review the
11:44:46 20 specific information that was in the questionnaire.
11:44:50 21 Q. And I take it Dr. Bishop was the
11:44:52 22 primary --
11:45:00 23 A. Conduit.
11:45:00 24 Q. -- conduit between the team and the
11:45:01 25 natural scientists?

11:45:03 1 A. Yes.
11:45:07 2 Q. Is environmental quality like that valued
11:45:11 3 in your survey a normal good?
11:45:16 4 MS. XIDIS: Objection to form.
11:45:18 5 A. That's a broad question that doesn't
11:45:22 6 really have an answer. Environmental -- you ask about
11:45:31 7 environmental quality in the abstract, but the reality
11:45:35 8 is that there are specific forms of environmental
11:45:39 9 quality of specific resources and specific locations.
11:45:45 10 When you say is it a normal good, you are referring to
11:45:50 11 preferences, which particular groups of people would
11:45:54 12 hold for that particular aspect of that particular
11:46:01 13 resource, and so you can't generalize.
11:46:05 14 Q. (BY MR. DEIHL) In this particular case,
11:46:13 15 as the price or the bid amount increases, would you
11:46:16 16 expect the willingness to pay or demand to fall?
11:46:22 17 MS. XIDIS: Objection to form.
11:46:24 18 A. I would expect in general and overall
11:46:30 19 there would be a declining proportion of people
11:46:33 20 willing to pay a given amount as that amount rises.
11:46:37 21 Q. (BY MR. DEIHL) And why is that?
11:46:39 22 A. Well, there is a general presumption that
11:46:48 23 since money has value, there will be a lower
11:47:00 24 willingness to pay an increasing amount for anything.
11:47:07 25 That's a presumption in theory and -- it's a

11:47:15 1 presumption in theory for a representative individual.
11:47:24 2 If you look across a group of people that you look at
11:47:28 3 specific price changes from one level to another, you
11:47:30 4 wouldn't necessarily expect to find this for anything,
11:47:35 5 for gasoline, for tobacco, for beer or for an
11:47:41 6 environmental good. Now, let me qualify this. You
11:47:45 7 wouldn't in fact expect to find it in theory for an
11:47:48 8 inferior good, but the point I'm -- the point I want
11:47:54 9 to emphasize is there is a distinction between the
11:48:00 10 theoretical presumption of a single individual and the
11:48:05 11 actual change in preference or behavior to a specific
11:48:11 12 price change from one particular level to another, and
11:48:16 13 you don't find demand curves declining at every price
11:48:20 14 change, say, for gasoline or tobacco or beer, as I
11:48:24 15 mentioned, even if it's plausible that they are normal
11:48:28 16 goods both because there is statistical variation in
11:48:33 17 data, but also because individuals don't in fact
11:48:39 18 respond to every little price change.
11:49:09 19 Q. If you could turn your attention back to
11:49:11 20 Deposition Exhibit No. 3. In the second -- I guess
11:49:22 21 it's the -- yeah, the second paragraph of this
11:49:26 22 document, it begins "In constructing the description."
11:49:28 23 Do you see that?
11:49:30 24 A. Yes.
11:49:31 25 Q. It states, "In constructing the

description of the public good and the remedial action, the researchers strive to be as accurate as possible in conforming to known facts of the situation." Would you agree with that?

A. No, and let me just say one thing. There are a number of features of the language which suggests that it was drafted before the majority of the team got together, because it sounds -- not terminology that I would use. This is an example. I made a distinction and will repeat it between the description of the injury and the description of the mechanism for remedying it, and I think the statement applies to the former, but not the latter.

Q. I'll represent to you that this was drafted by Dr. Krosnick. I don't know the date of the document, but it was drafted by Dr. Krosnick. So you would disagree with Dr. Krosnick between -- you would disagree with this sentence as it applies to the remedial action?

MS. XIDIS: Objection to form.

A. Yes, and as I say, I'm sure it wasn't drafted with input from myself.

Q. (BY MR. DEIHL) The next sentence reads, "In cases where a relevant fact is not known exactly, the researchers strive to present information that is

11:51:03 1 as plausible as possible." Do you agree with that
11:51:05 2 sentence?
11:51:11 3 A. I'm not sure I do.
11:51:15 4 Q. Okay. Why not?
11:51:18 5 A. Well, an alternative sentence would be,
11:51:18 6 "In cases where a relevant fact is not known exactly,
11:51:26 7 one presents information -- approximate information."
11:51:33 8 Q. And that's what you would strive to do,
11:51:35 9 present approximate information?
11:51:37 10 MS. XIDIS: Object to form.
11:51:39 11 A. This sentence has a contrast between
11:51:45 12 knowing something exactly and knowing -- or something
11:51:46 13 being plausible, and that strikes me as an odd
11:51:52 14 contrast. So let me emphasize. I think it's
11:52:00 15 important that information presented be seen as
11:52:03 16 plausible by respondents, but I'm just -- I find the
11:52:09 17 setup of this wording a little odd.
11:52:11 18 Q. (BY MR. DEIHL) Take a look at the last
11:52:15 19 sentence in that paragraph. It reads, "In fact, the
11:52:18 20 economic value measured by a contingent valuation
11:52:20 21 survey is only interpretable if the public good being
11:52:24 22 'purchased' by respondents is precisely described in
11:52:28 23 the survey." Do you agree with that?
11:52:30 24 A. No, I don't.
11:52:30 25 Q. Why not?

11:52:31 1 A. Well, in this case -- I mean, both the
11:52:37 2 lawsuit, but I mean in this setting, we are presenting
11:52:43 3 information to a decision maker, which is the court,
11:52:45 4 the judge or the jury, whatever the setting is. The
11:52:48 5 research team isn't the decision maker. The court,
11:52:52 6 the jury is the decision maker. We value -- to use
11:53:03 7 the jargon of economists, we value a commodity. We
11:53:07 8 value an injury described in a particular way, and
11:53:11 9 that's information that we would like the decision
11:53:13 10 maker, say the jury, to take into consideration.
11:53:16 11 If the jury reaches a conclusion that the
11:53:20 12 injury is different from what we describe in whatever
11:53:24 13 way, smaller, larger or whatever, it's the -- the jury
11:53:26 14 is the decision maker to determine for itself whether
11:53:33 15 it can usefully incorporate our information, whether
11:53:37 16 it can map from the injury we have valued to the
11:53:41 17 injury the jury decides has occurred. And that's a
11:53:45 18 situation which is not uncommon, not limited to
11:53:48 19 trials. You have information about a certain set of
11:53:52 20 facts and you may need to determine if you can apply
11:53:54 21 them to a different set of facts, whether slightly
11:54:03 22 different or very different, so I don't think the
11:54:09 23 wording of this sentence is sort of accurate or
11:54:11 24 realistic.
11:54:11 25 I think the information can be

11:54:16 1 interpretable and usable to a decision maker if in the
11:54:20 2 decision maker's mind there is enough similarity or at
11:54:28 3 least if there is some mapping from the information we
11:54:30 4 present to him or her and the situation that the
11:54:35 5 decision maker decides applies.
11:55:00 6 Q. Take a look at the next page of this
11:55:01 7 memo, please. The second full paragraph, in about the
11:55:09 8 middle of that paragraph there is a statement that
11:55:10 9 reads, "Decades of work developing the contingent
11:55:13 10 valuation method have led experts to share the belief
11:55:16 11 that all necessary information should be presented
11:55:20 12 precisely to respondents, even if some of the
11:55:24 13 information is in fact hypothetical." Would you agree
11:55:26 14 with Dr. Krosnick's statement that all necessary
11:55:30 15 information should be presented precisely to
11:55:33 16 respondents?
11:55:35 17 A. Again, I'm not sure quite what he means
11:55:41 18 by that. My own view is that it's desirable to
11:55:46 19 present concrete and specific information, and so
11:55:52 20 that's a statement I would make.
11:56:07 21 Q. In the next paragraph, the first sentence
11:56:09 22 reads, "As is often true, the process of developing
11:56:13 23 the survey questionnaire in this case has begun before
11:56:16 24 the natural scientists working on the case have fully
11:56:18 25 documented all the facts that will be described in the

11:56:20 1 questionnaire." Was that true in this case?
11:56:24 2 A. The sentence says, "As is often true,"
11:56:28 3 and it is often true. In fact it's in natural
11:56:35 4 resource damage cases always true, that it's necessary
11:56:39 5 to start some of the economic analysis before all of
11:56:43 6 the natural science analysis is completed, and that
11:56:46 7 was true here.
11:56:46 8 (Deposition Exhibit 6 was marked.)
11:57:20 9 MS. XIDIS: Can I get a copy, please?
11:57:26 10 MR. DEIHL: Yes.
11:57:30 11 Q. (BY MR. DEIHL) Dr. Hanemann, I've handed
11:57:31 12 you what's been marked as Deposition Exhibit No. 6.
11:57:35 13 Can you identify this document, please.
11:57:43 14 A. This is an e-mail from Edward to myself
11:57:52 15 and various other recipients on the 31st of
11:58:01 16 August 2006.
11:58:03 17 Q. And this e-mail attaches a document
11:58:07 18 entitled "Oklahoma - suggested stuff to learn from a
11:58:15 19 September focus group a quick phone survey." Do you
11:58:18 20 see that?
11:58:22 21 A. There is two pages. I don't know what
11:58:24 22 the title -- oh, I see what you mean. Yes, at the
11:58:26 23 head -- yes.
11:58:30 24 Q. Okay. In the appended notes that Edward
11:58:37 25 attached -- and by "Edward," you understand this to be

11:58:41 1 Dr. Morey?
11:58:41 2 A. Yes.
11:58:45 3 Q. He indicates "Stuff to determine." Do
11:58:46 4 you see that?
11:58:48 5 A. I'm sorry, yes.
11:58:50 6 Q. In the middle of the page there is a
11:58:52 7 phrase that reads "Stuff to determine," correct?
11:58:54 8 A. Yes.
11:59:00 9 Q. And below that, No. 1 is "Give them a
11:59:03 10 list of state-wide issues and have them provide a
11:59:07 11 ranking, or partial ranking, in terms of how much they
11:59:09 12 'care' or are 'concerned.'" Do you see that?
11:59:13 13 A. Yes.
11:59:15 14 Q. Did you do that in these initial focus
11:59:18 15 groups or quick phone surveys?
11:59:26 16 A. Which quick phone surveys are you
11:59:28 17 referring to?
11:59:30 18 Q. Well, at the top of the page it indicates
11:59:31 19 that you would like to get this information either
11:59:31 20 from a September focus group or a quick phone survey.
11:59:37 21 My question was whether you ever made an effort to
11:59:39 22 obtain this information?
11:59:45 23 A. Well, first of all, this is what
11:59:46 24 Dr. Morey thought should be done and so it's his
11:59:50 25 thoughts on the subject. And in focus groups, item 1

was touched on, so it was touched on.

Q. How was it touched on?

A. Well, in some of the focus groups, they were presented with -- one I'm thinking of specifically is the material at the beginning of the survey, so I'm looking at page A-3, which is the face of it. There is a series of questions on page A-3 and also a series of questions on A-4 and A-5 and A-6, and questions like that in some form I think appeared in -- early on in focus groups, and so that's what I was referring to in answering your question.

Q. And in submitting those questions to the participants in focus groups, you were trying to determine whether or not they cared about the environment, for example?

MS. XIDIS: Objection to form.

A. We were -- in submitting questions like this, we wanted to understand their attitudes to the items contained in the question, and on page A-3 those items would include water pollution along with five other items.

Q. (BY MR. DEIHL) In the focus groups you asked different questions than the ones in the base survey, right?

A. What was asked evolved in the focus

12:02:24 1 groups, so this is the final language, not the
12:02:28 2 earliest language.
12:02:30 3 Q. During this focus group process, what did
12:02:37 4 the respondents say about how they ranked
12:02:39 5 environmental issues; do you know?
12:02:43 6 A. No, I don't recall.
12:02:45 7 Q. If you had found in the focus group that
12:02:46 8 environment was not one of their top-ranking issues,
12:02:50 9 would that have affected your study?
12:02:54 10 MS. XIDIS: Objection to form.
12:03:01 11 A. I don't think so for the following
12:03:03 12 reason: We are measuring their preference for
12:03:09 13 removing particular injuries in the Illinois River,
12:03:11 14 for accelerating the removal. We're interested in
12:03:16 15 measuring that preference, in fact their willingness
12:03:20 16 to pay to do that, whatever it is. It may be larger
12:03:24 17 than their willingness to pay for certain other items,
12:03:28 18 it may be smaller. In that sense it didn't matter to
12:03:31 19 us. We wanted to measure the preference for this
12:03:35 20 particular environmental commodity, to use a term of
12:03:41 21 art, whatever that was, and so if that turned out to
12:03:45 22 rank lower than some other things, so be it. That's
12:03:50 23 why I answered no to your question.
12:04:03 24 Q. (BY MR. DEIHL) Other things being equal,
12:04:07 25 wouldn't the people who rank, for example, improving

12:04:11 1 local libraries be less likely to vote yes than the
12:04:18 2 people who ranked reducing water pollution in Oklahoma
12:04:22 3 lakes and rivers?
12:04:24 4 MS. XIDIS: Objection to form.
12:04:26 5 A. No, that is -- I don't have an intuition
12:04:30 6 as to whether a person whose number one priority was
12:04:35 7 improving local libraries would be more or less
12:04:39 8 likely -- more or less willing to pay $80, let's say,
12:04:46 9 to fix this particular problem.
12:04:48 10 Q. (BY MR. DEIHL) Why is that?
12:04:52 11 A. I don't understand how one could have --
12:04:54 12 I don't understand how one could infer -- I don't
12:05:03 13 understand how one can make the inference you seem to
12:05:07 14 be implying that a person who thought libraries the
12:05:11 15 most important policy issue would or would not be
12:05:16 16 willing -- more or less willing by virtue of that fact
12:05:20 17 to pay, say, $80 to eliminate pollution or for that
12:05:26 18 matter would be more or less willing to pay $80 to
12:05:31 19 help farmers increase their income or whatever the
12:05:33 20 other items where were.
12:05:37 21 Q. Did you inform respondents that there
12:05:41 22 were going to be other tax increases for other public
12:05:43 23 goods, for example, you know, they had to bid $100 for
12:05:48 24 improvement of Tenkiller Lake and they would also be
12:05:50 25 asked to pay $100 to improve the library system?

12:06:00 1 A. No.
12:06:01 2 Q. Why?
12:06:01 3 A. Because there isn't such a proposal. We
12:06:03 4 were valuing this commodity. They were aware that
12:06:09 5 public funds could be spent on other issues, but this
12:06:13 6 is the issue that we were valuing.
12:06:30 7 Q. Did you modify the survey instrument
12:06:31 8 based on the focus group participants' knowledge of
12:06:35 9 the alleged injury to the river?
12:06:45 10 A. Let me answer the question this way: In
12:06:48 11 the focus groups, we tested respondents' understanding
12:07:01 12 of the information we presented and also their
12:07:07 13 acceptance of that, and we modified the instrument as
12:07:13 14 appropriate to deal with issues that arose in both
12:07:20 15 cases. That is, if they didn't understand something
12:07:24 16 that we were trying to say, we would modify the
12:07:28 17 language so that they would understand it. And if
12:07:31 18 they had questions or if they had found something --
12:07:35 19 if they didn't accept something we were saying, we
12:07:39 20 tried as best we could to understand the issue, what
12:07:45 21 was going on there and find a way so that they would
12:07:48 22 be comfortable and accepting of the information we
12:07:52 23 gave them.
12:07:52 24 Q. During this focus group process, were
12:08:00 25 there some participants who didn't accept your

12:08:03 1 description of the injury to the waterway?
12:08:15 2 A. I guess -- I'm sure that at least once,
12:08:20 3 maybe more often, people didn't accept the description
12:08:30 4 as it existed at the particular forum we were testing.
12:08:33 5 By the time we had finished developing the instrument,
12:08:35 6 and that was the purpose of the development process,
12:08:43 7 there was a high level of acceptance.
12:08:48 8 Q. How did you modify the instrument when
12:08:52 9 you determined that participants weren't accepting the
12:09:00 10 description of the injury that you were providing to
12:09:03 11 them?
12:09:03 12 MS. XIDIS: Objection to form.
12:09:13 13 A. You know, I think the best way for you to
12:09:16 14 get an answer to that question is you have all of the
12:09:22 15 documentation of all of the focus groups and so you
12:09:26 16 will see both what people said in a particular focus
12:09:31 17 group in response to a particular text and how that
12:09:35 18 text was changed subsequently. I can't give a general
12:09:39 19 answer.
12:09:39 20 Q. (BY MR. DEIHL) Well, you didn't record
12:09:41 21 what was said in the focus group, did you?
12:09:48 22 A. We don't have tape recordings, but we
12:09:50 23 asked many of the -- in the focus groups at various
12:09:54 24 points, we asked people to write down on sheets of
12:10:01 25 paper -- I mean, they were asked questions by the

12:10:03 1 moderator and they were asked to write their answer
12:10:05 2 down on sheets of paper, and those sheets of paper
12:10:09 3 were collected afterwards and I believe were
12:10:13 4 preserved.
12:10:15 5 Q. And did you observe these focus groups?
12:10:16 6 A. Yes.
12:10:18 7 Q. How many of the focus groups did you
12:10:20 8 observe?
12:10:22 9 A. I don't know.
12:10:22 10 Q. A number of them?
12:10:22 11 A. Yes, a number of -- a large number of
12:10:24 12 them.
12:10:26 13 Q. What was the purpose of your observations
12:10:28 14 of the focus groups? Why were you observing them?
12:10:30 15 A. Well, I was a member of the team and the
12:10:33 16 purpose for all the team was to learn from the focus
12:10:37 17 groups, and so that's why we attended focus groups as
12:10:43 18 often as we could.
12:10:45 19 Q. Did you take notes during the focus
12:10:46 20 groups?
12:10:48 21 A. I sometimes took brief notes, yes.
12:10:52 22 Q. So after you would attend a focus group
12:11:00 23 with the other team members, what would you do with
12:11:01 24 the information you learned during that focus group?
12:11:05 25 A. Well, the typical setup was that after

12:11:11 1 the focus group was concluded, there would be a
12:11:15 2 discussion among the team members about what had
12:11:18 3 transpired and what we had learned, and that in turn
12:11:22 4 would then lead to modifications to the instrument,
12:11:26 5 either there and then or the next day or at least
12:11:30 6 shortly there afterwards, so most of the functioning
12:11:33 7 of the focus groups took the form of discussions
12:11:39 8 immediately afterwards or very close there afterwards
12:11:41 9 and subsequent modifications, again, immediately there
12:11:46 10 afterwards or very close there afterwards.
12:11:50 11 Q. So if I'm understanding you correctly,
12:11:52 12 the survey instrument was this sort of living document
12:12:00 13 that you tested with the focus group, modified with
12:12:01 14 the particular -- after the focus group and then
12:12:05 15 tested it again on the next focus group?
12:12:07 16 A. That's exactly right, yes.
12:12:07 17 Q. Okay. And those modifications that you
12:12:09 18 were making to the instrument were based on what you
12:12:13 19 heard during the focus groups?
12:12:15 20 A. Yes. They would also be based -- I mean,
12:12:16 21 what we heard would obviously be a source of
12:12:20 22 information. Sometimes, though, team members thought
12:12:24 23 of something which seemed cogent to them not because
12:12:30 24 somebody said it in the focus group, but just because
12:12:31 25 they had thought of something, so this continual

refinement of the instrument would incorporate both things learned from the focus group but also other ideas that occurred to the team members as this process continued.

Q. And I take it you would refine the instrument if you thought the focus group participants didn't understand something that they were being told?

A. Yes.

Q. So, for example, if the instrument -- if the participants had been told about the injury to the Illinois River and their responses indicated that they didn't think the Illinois River was injured, you would modify the survey document the next time to try to convey to them the injury?

MS. XIDIS: Objection to form.

A. I don't recall that situation, type of situation occurring. It may have occurred. Examples would be that people don't understand literally what the word -- what we meant when we said "algae," and they knew this as plants or grass or some other term. Or they -- for example, with the photograph, there was a particular photograph which had sunlight maybe on the water and they thought that was snow, because it was sort of white, so we needed to either explain that that wasn't snow, that was sun on the water or change

12:14:18 1 the picture.
12:14:20 2 So the issues of not understanding or not
12:14:30 3 accepting are things about the river, let's say, or
12:14:35 4 the lake didn't arise or at least didn't arise very
12:14:39 5 often. It was much more the details of this, which
12:14:43 6 fish were affected or, as I say, what we called algae
12:14:50 7 was, things like that.
12:14:54 8 THE VIDEOGRAPHER: Excuse me, Counsel.
12:14:54 9 We need to change the tape in probably the next four
12:15:00 10 minutes.
12:15:01 11 MR. DEIHL: Thank you. Why don't we do
12:15:03 12 that right now.
12:15:03 13 THE VIDEOGRAPHER: Going off the record.
12:15:05 14 The time is 12:15. This marks the end of Tape 1.
12:15:07 15 (Recess taken, 12:15 p.m. to 12:23 p.m.)
12:23:22 16 THE VIDEOGRAPHER: This marks the start
12:23:24 17 of Tape 2 of the videotape deposition of Michael
12:23:26 18 Hanemann. Back on the record. The time is 12:23.
12:23:31 19 THE DEPONENT: Can I just add one
12:23:31 20 additional --
12:23:33 21 Q. (BY MR. DEIHL) Sure.
12:23:33 22 A. What struck me personally in observing
12:23:37 23 focus groups was how a description of the injuries
12:23:43 24 resonated with many of the participants. So, as I
12:23:50 25 say, this was something that resonated with people who

had any familiarity with the site, and in particular who had familiarity of a time; that is, who had been there in the past.

So if your premise was that the facts at least at first started out at as -- the broad facts, that wasn't my recollection of how it unfolded.

Q. (BY MR. DEIHL) Did you ask respondents about their decisions to recreate or not recreate at the site?

A. Yes. That is, I'm sure in the course of focus -- I'm sure that came up in focus group discussions. One of the ways in which it would come up is that participants in the focus group would start talking about their recreational experiences, either going there or not going there, and then that would trigger a discussion with other participants in the focus group sort of chiming in, so there were two ways this would have happened. One, if the moderator specifically asked a question about recreation, but the other is respondents brought up recreation very commonly in response to material that was presented to them.

Q. Well, let's break those down. Did the moderator ask the respondents about recreation in the focus groups?

12:25:28 1 A. There were many focus groups and I don't
12:25:31 2 recall the details, and so I think that happened some
12:25:35 3 of the time, but I don't have the detailed, you know,
12:25:39 4 scripts for the focus groups. The second thing, as I
12:25:43 5 say, happened very often; that is, as we got into
12:25:48 6 showing pictures or talking about water quality, at
12:25:52 7 every focus group I attended, somebody would bring up
12:26:00 8 the -- would start talking about recreation.
12:26:03 9 Q. In the final survey document, did you ask
12:26:05 10 the respondents about their decisions to recreate or
12:26:09 11 not recreate at this site?
12:26:11 12 A. Let me go to the instrument. There are
12:27:26 13 two pages I'm looking at. One is page A-8, where
12:27:33 14 early on in the narrative, questions 14 and 17 ask
12:27:39 15 if -- we asked people if they've ever visited Illinois
12:27:45 16 River and Tenkiller Lake, and then moving on, on page
12:27:48 17 12, A-12, we asked respondents who have answered yes
12:28:03 18 to either 14 or 15, those are two previous questions,
12:28:07 19 have you personally seen any of these changes or have
12:28:11 20 you just not seen any of these changes?
12:28:22 21 Q. So you asked them what year they first
12:28:24 22 visited the site and what year their most recent visit
12:28:28 23 to the site was?
12:28:30 24 A. That's right.
12:28:31 25 Q. Did you test your assertion that

12:28:33 1 recreational use began to decline in the late 1950s,
12:28:37 2 early 1960s?
12:28:41 3 MS. XIDIS: Objection to form.
12:28:45 4 A. We didn't test that. My understanding is
12:28:50 5 that we didn't have time series data.
12:29:00 6 Q. (BY MR. DEIHL) Didn't have what, I'm
12:29:01 7 sorry?
12:29:01 8 A. Time series data. That is data on
12:29:03 9 attendance from the 18- -- from the 1960s, excuse me.
12:29:09 10 Q. Why didn't you have time series data?
12:29:13 11 A. Actually, could you repeat the previous
12:29:15 12 question; that is, before why didn't -- what assertion
12:29:20 13 were you asking about? So what was the question
12:29:20 14 again?
12:29:22 15 Q. I can ask it again. My question was:
12:29:24 16 Did you test your assertion that recreational use
12:29:28 17 began to decline in the late 1950s, early 1960s?
12:29:31 18 A. Thank you. Could you tell me where that
12:29:31 19 assertion is made? Is that in the question?
12:29:35 20 Q. Well, no. This morning when we were
12:29:35 21 talking about why you chose 19- -- late 1950s, early
12:29:39 22 1960s, you said that that was what the natural
12:29:45 23 scientists -- that was when the natural scientists
12:29:48 24 were telling you that the water quality began to
12:29:50 25 decline --

12:29:50 1 A. I understand that.
12:29:52 2 Q. -- and that people had stopped using the
12:29:54 3 resource.
12:29:54 4 A. That's right.
12:30:00 5 MS. XIDIS: Objection to form.
12:30:00 6 A. Excuse me. That's something that was
12:30:03 7 mentioned quite frequently by focus group
12:30:05 8 participants. They used to -- either they used to go
12:30:11 9 before but stopped going or went less often or they
12:30:16 10 went, but made efforts to stay out of the water now
12:30:20 11 because it was unpleasant.
12:30:24 12 Q. (BY MR. DEIHL) How do you square those
12:30:26 13 answers in the focus groups to the information you
12:30:31 14 obtained through the telephone survey and the
12:30:33 15 recreation intercept survey that showed that people
12:30:37 16 liked the Illinois River and Tenkiller Lake?
12:30:41 17 MS. XIDIS: Objection to form.
12:30:41 18 A. Well, the intercept survey showed that
12:30:45 19 the people who go there liked it and that's not at all
12:30:48 20 surprising, but what you would need is a population
12:30:54 21 survey to find out the preponderance of the population
12:31:03 22 that goes there and that like it for recreation, so I
12:31:07 23 don't think the -- the intercept survey by its
12:31:09 24 definition can't tell you the use of the general
12:31:15 25 public and won't tell you. It will tell you about the

people who go there. It won't tell you about the people who don't go there now and it won't tell you about people who used to go there in the past but don't go there now, so that didn't provide information one way or the other on those issues.

Q. (BY MR. DEIHL) You mention earlier something you referred to as time series data. What is that?

A. Oh, that's data on some variable of interest measured consistently over a period of time.

Q. Did you look at data from the Army Corps of Engineers or the state regarding usage levels on the Illinois River and Tenkiller Lake over time?

A. No.

Q. Why not?

A. I don't believe the data on trends, changes in attendance at that site by itself would be adequate to determine whether people who used to go there stopped going, because you need to look at -- you need population level data about participation in this recreation, so you need something like the national hunting, fishing and wildlife data, except that doesn't provide information about attendance in particular sites, but you would need a statewide survey data done periodically, which provided

12:33:09 1 information on particular sites.
12:33:15 2 The Army Corps of Engineers data is the
12:33:16 3 sort of data that was used in the demand studies,
12:33:18 4 recreation demand studies done in the 1960s, but
12:33:22 5 that's a very old-fashion type of study and basically
12:33:26 6 doesn't cut the mustard.
12:33:28 7 Q. Did you attempt to find any data to
12:33:30 8 show -- to demonstrate whether or not recreational
12:33:33 9 usage on the Illinois River and Tenkiller Lake had
12:33:39 10 increased or decreased since the late 1950s?
12:33:43 11 A. I don't know if Stratus looked for those
12:33:46 12 data. David Chapman is the person you should ask that
12:33:52 13 question of. I myself wasn't in a position to know
12:33:54 14 those data sources.
12:34:01 15 But also let me remind you that this is
12:34:03 16 something of a red herring because our objective was
12:34:11 17 to measure the injuries, which would include nonuse
12:34:15 18 values as well as use values, and so by itself even
12:34:20 19 good data on recreation -- even a good recreation
12:34:24 20 study of the sort that I think would require data
12:34:28 21 other than the Army Corps of Engineers wouldn't shed
12:34:31 22 light on the total loss to the people of Oklahoma as a
12:34:33 23 result of the injuries in this watershed.
12:34:41 24 Q. Well, the reason we got down this topic
12:34:43 25 area is earlier you had indicated that as part of the

12:34:46 1 focus groups, you thought that the injury resonated
12:34:52 2 with the respondents, and I was asking you these
12:35:00 3 questions to understand whether you actually did any
12:35:01 4 investigation to determine if not just the respondents
12:35:05 5 in the focus groups, but the citizens of Oklahoma as a
12:35:09 6 whole thought that the injury had gotten more severe
12:35:15 7 since the late 1950s and early 1960s. And I think you
12:35:18 8 told me that you did not attempt to review any sort of
12:35:24 9 recreation data statewide to determine if the citizens
12:35:28 10 of Oklahoma as a whole were using this resource more
12:35:31 11 or less than they had been in the late 1950s, early
12:35:35 12 1960s. Is that right?
12:35:35 13 MS. XIDIS: Objection to form.
12:35:39 14 A. I'm sorry, what was the question?
12:35:41 15 Q. (BY MR. DEIHL) You did not review any,
12:35:45 16 as you called it, time series data to determine if
12:35:50 17 recreational use had increased or decreased since the
12:35:54 18 late 1950s, early 1960s?
12:36:03 19 A. This is -- your question compounds two
12:36:05 20 different things. Whether recreation -- whether
12:36:09 21 attendance, let's say, at this site had increased
12:36:11 22 since the 1960s by itself tells you nothing. The
12:36:13 23 population has increased since the 1960S. Population
12:36:15 24 participation in various forms of recreation has
12:36:20 25 changed since the 1960s, so if you were to try -- if

12:36:24 1 you had data and wanted to form, even add a
12:36:24 2 determination about the impact on use value, you would
12:36:30 3 need to standardize that data. You need to
12:36:33 4 standardize the attendance data against data about
12:36:37 5 both population in a given area, whether these are
12:36:43 6 residents or nonresidents and any change in overall
12:36:46 7 participation in outdoor recreation. Let me --
12:36:52 8 Q. But you didn't try to do that here?
12:36:54 9 A. I'm not aware of data -- first of all, I
12:37:01 10 don't know what data Stratus might have found
12:37:05 11 available or not. I wasn't aware of this data
12:37:09 12 being -- such data being available. And also let me
12:37:15 13 emphasize our job was -- our task was to measure the
12:37:22 14 value, the impact and the total value, but that
12:37:28 15 includes use value and nonuse value. Attendance by
12:37:31 16 itself doesn't tell you about loss of value. That is,
12:37:35 17 people may attend a site, but get less enjoyment from
12:37:41 18 it and therefore get a reduction in consumer surplus
12:37:45 19 even if they attend the site. So the attendance by
12:37:46 20 itself is only one piece of the puzzle. It's not the
12:37:50 21 whole puzzle, and as I've said earlier, I don't
12:37:54 22 believe -- I mean, from what I know about the
12:38:01 23 recreation sites, the mix of sites, I don't believe it
12:38:05 24 is possible to develop a valid method using the
12:38:09 25 modern -- a valid estimate of the impact on consumer

12:38:15 1 surplus on use value from recreation using what are
12:38:18 2 the standard well-accepted tools of recreation demand
12:38:24 3 modeling, given the set of sites, given the set of
12:38:28 4 circumstances in Oklahoma today.
12:38:30 5 Q. Didn't your peer reviewer, Kerry Smith,
12:38:31 6 say that it might be useful to also document
12:38:37 7 recreation use as part of your survey?
12:38:39 8 A. Would you -- you are referring to some
12:38:43 9 document. Perhaps you can show it to me.
12:38:45 10 Q. Well, I'm just asking what you remember
12:38:46 11 about what Mr. Smith told you.
12:38:48 12 A. I don't remember what Mr. Smith said.
12:38:50 13 Q. You don't? Okay.
12:38:50 14 A. No.
12:38:50 15 Q. Do you remember anything from Mr. Smith's
12:38:52 16 peer-review comments to you?
12:38:54 17 A. No. I know he made a set of comments. I
12:39:00 18 don't remember what they were.
12:39:00 19 Q. Okay. Did you change anything in your
12:39:03 20 survey as a result of Mr. Smith's comments?
12:39:09 21 A. Frankly, the answer is I don't remember.
12:39:13 22 I don't know one way or the other. I know we
12:39:16 23 discussed these issues with Dr. Smith to his -- and
12:39:22 24 they were resolved to his satisfaction.
12:39:37 25 Q. Did you ask the users in either the

12:39:41 1 telephone survey or the intercept survey whether they
12:39:45 2 had changed their behavior because of changes in water
12:39:46 3 quality?
12:39:48 4 A. I don't know. I don't know what was --
12:39:50 5 as I sit here now, I don't recall what was in the text
12:39:54 6 of those two surveys.
12:39:54 7 Q. You certainly could have done that,
12:40:00 8 couldn't have you?
12:40:01 9 A. You asked me first if we did and so the
12:40:05 10 answer to that question is I don't know. And I don't
12:40:13 11 think the phone survey was -- I would make a
12:40:20 12 distinction between the two surveys, but it may be --
12:40:26 13 it may be possible to ask some such question in the
12:40:30 14 intercept survey. It would be limited in the
12:40:33 15 information it would generate because many of the
12:40:37 16 people intercepted were young and we're talking about
12:40:37 17 changes which took place over whatever it is, two or
12:40:41 18 three, four decades, and so I don't know if that would
12:40:45 19 have been a useful source of information.
12:40:50 20 Q. Did you document in your contingent
12:40:54 21 valuation survey the changes in recreation that people
12:41:03 22 said they made?
12:41:07 23 A. I'm not sure what you mean by that
12:41:07 24 question.
12:41:09 25 Q. Well, I thought earlier you indicated

12:41:09 1 that as part of this focus group process, you learned
12:41:13 2 that people had changed the way they used this
12:41:18 3 resource.
12:41:18 4 A. Yes.
12:41:18 5 Q. Did you document that anywhere?
12:41:20 6 A. You mean did I collect -- well, one way
12:41:22 7 it would come out -- the way it would come out is the
12:41:26 8 contrast of question 14A and 14B, and in particular
12:41:33 9 how recent the most recent visit was for people who
12:41:37 10 had been living for some time and had visited at some
12:41:43 11 time in the past.
12:41:43 12 Q. Did you report your conclusions of that
12:41:46 13 information in the report?
12:41:48 14 A. Well, I believe -- well, all of the data
12:41:52 15 from the report is -- you have. We tabulated various
12:42:03 16 variables in the appendix, and I don't recall what is
12:42:07 17 tabulated or not, but a description of the change in
12:42:13 18 recreation I think would -- is neither here nor there
12:42:22 19 in this report because we were trying to measure the
12:42:24 20 average value per household in Oklahoma ignoring the
12:42:28 21 western portion of the state for this injury, and the
12:42:31 22 number of changes in recreation don't -- are not
12:42:43 23 conducive to the measure that we were putting
12:42:48 24 together, asked to put together, namely the value to
12:42:50 25 the people of Oklahoma.

12:42:52 1 Q. In other studies you've been involved in,
12:42:54 2 there was a recreation component and a contingent
12:43:01 3 valuation component, right?
12:43:05 4 MS. XIDIS: Objection to form.
12:43:07 5 A. In Mono Lake that was the case.
12:43:11 6 Q. (BY MR. DEIHL) And why did you do that
12:43:11 7 in the Mono Lake study?
12:43:13 8 A. Because the legal setting was -- the
12:43:18 9 State Water Resources Control Board was required by
12:43:22 10 the court, in a California appeals court, to balance
12:43:28 11 beneficial uses, and recreation was a separate
12:43:30 12 beneficial use in that setting from what I'm calling
12:43:35 13 public trust uses for wildlife, and so we were
12:43:39 14 required literally to measure the separate and
12:43:45 15 official uses.
12:43:52 16 Q. Would you agree with me that documented
12:44:00 17 behavioral changes would be a plausibility check on
12:44:03 18 whether at least users were impacted by the alleged
12:44:07 19 injuries?
12:44:07 20 MS. XIDIS: Objection to form.
12:44:15 21 A. They certainly could be evidence, but I
12:44:18 22 think the major changes occurred in the past two,
12:44:26 23 three decades ago, and I'm not aware of data that were
12:44:31 24 available here which would emit the sort of analysis
12:44:37 25 that you are referring to.

12:44:39 1 Q. (BY MR. DEIHL) Wouldn't your questions
12:44:41 2 14A and 14B capture a portion of that?
12:44:50 3 A. They would capture some portion of that,
12:45:00 4 but we had measures from these people. Our
12:45:03 5 respondents were being presented with a tradeoff,
12:45:05 6 which they were free to make or not make, and we
12:45:15 7 had -- and they would have a mix. They could be
12:45:18 8 motivated by considerations of use or nonuse, and what
12:45:24 9 we had from the -- from their responses to the
12:45:28 10 tradeoff was their overall assessment of water quality
12:45:31 11 in the Illinois River, their overall assessment of
12:45:33 12 whether to make the tradeoff, spend the money,
12:45:35 13 accelerate the reduction in injury or not spend the
12:45:39 14 money and let the injury take its course. That was
12:45:45 15 direct evidence on point of their assessment of the
12:45:46 16 overall situation. I don't think anything useful will
12:45:50 17 be gained by looking at, in this context, that
12:46:01 18 recreation.
12:46:05 19 Q. Why didn't you ask the respondents why
12:46:09 20 they stopped visiting Tenkiller Lake in the survey
12:46:13 21 instrument?
12:46:16 22 A. I don't think that information would have
12:46:18 23 been useful. I mean -- and could have been used, and
12:46:22 24 we wanted to keep the instrument as short as possible,
12:46:26 25 and so it added length and didn't add benefit.

12:46:37 1 Q. Your survey instrument doesn't tell you
12:46:41 2 why participants may have stopped visiting Tenkiller
12:46:45 3 Lake, does it?
12:46:48 4 A. It doesn't.
12:46:52 5 Q. Okay. Do you know what the average
12:47:26 6 length of time was the respondents lived in Oklahoma?
12:47:33 7 A. I don't recall that.
12:47:33 8 Q. Did you ask them that question?
12:48:11 9 A. Yes, we did.
12:48:13 10 Q. And what was the results of that
12:48:15 11 question?
12:48:18 12 A. I offhand don't recall.
12:48:22 13 Q. Okay. Why did you not choose to test
12:48:48 14 your assertion that recreational use began to decline
12:48:50 15 in the late 1950s, early 1960s?
12:48:54 16 MS. XIDIS: Objection to form.
12:49:03 17 A. I think you are mischaracterizing --
12:49:03 18 well, what we asserted was that water quality changed
12:49:11 19 sometime after that period, and I'm asserting that
12:49:16 20 that would have affected recreation sometime after
12:49:20 21 that period. So you asked me -- you referred to
12:49:26 22 declining in the 1950s and the 1960s and the point I'm
12:49:30 23 making is I'm referring to something that would have
12:49:31 24 happened after -- sometime after that.
12:49:35 25 Q. (BY MR. DEIHL) No, I understood that.

12:49:35 1 Perhaps I misspoke. I'm asking you why you didn't
12:49:37 2 test your assertion that use declined sometime after
12:49:43 3 the 1950s or early 1960s?
12:49:46 4 A. Because I don't see -- I don't think we
12:49:50 5 could have used that information to measure what we
12:49:54 6 were being asked to measure. We were asked to measure
12:50:13 7 the value that the people of Oklahoma placed on the
12:50:18 8 injuries to the river and lake, so the question you
12:50:26 9 described would not give us a useful measure of that
12:50:30 10 value.
12:50:31 11 Q. Wouldn't the question I described have
12:50:33 12 given you a useful measure of whether or not the
12:50:37 13 citizens of Oklahoma thought there was an injury to
12:50:39 14 the Illinois River and Tenkiller Lake?
12:50:41 15 MS. XIDIS: Objection to form.
12:50:43 16 A. I think the useful information, the
12:50:46 17 most -- the information that's on point is how they
12:50:50 18 made the tradeoff. If they felt that the situation in
12:51:00 19 the Illinois River and the lake were fine or were only
12:51:03 20 of minor importance, the changes were only of minor
12:51:07 21 importance to them, they would vote no against the
12:51:13 22 proposal to spend their money to fix it. That is the
12:51:16 23 proof of the pudding. That's the issue, and that's
12:51:18 24 the direct -- the most direct measure and I think the
12:51:22 25 most relevant one for what's at stake here.

12:51:26 1 Q. (BY MR. DEIHL) What percentage of the
12:51:28 2 respondents remembered what the Illinois River and
12:51:30 3 Tenkiller Lake looked like in the late 1950s, early
12:51:33 4 1960s?
12:51:35 5 A. I don't know, and I don't think that's
12:51:39 6 relevant. What's relevant is today. It's the injury
12:51:43 7 that they are placing -- I'm sorry. It's the value
12:51:46 8 they are placing on the injury today and in the
12:51:50 9 prospective years when that injury will occur.
12:52:00 10 Q. You're telling the respondents that the
12:52:01 11 water body is injured, correct?
12:52:03 12 A. Yes.
12:52:15 13 Q. Did you ask the respondents in the survey
12:52:16 14 if they would use the Illinois River or Tenkiller Lake
12:52:22 15 if the water quality improved?
12:52:26 16 A. No.
12:52:28 17 Q. Why not?
12:52:30 18 A. Well, what is relevant for the assessment
12:52:35 19 of damages is the total value, and the question you
12:52:41 20 described wouldn't be helpful for measuring the total
12:52:45 21 value.
12:52:45 22 Q. But wouldn't you expect a relationship
12:52:46 23 between use and water quality?
12:52:50 24 MS. XIDIS: Objection to form.
12:53:00 25 A. First of all, the total value includes

12:53:01 1 nonuse value and there is no determinant relationship
12:53:05 2 between use or use value and nonuse value.
12:53:09 3 Secondly, there is not necessarily a
12:53:11 4 determinant relationship between use and use value,
12:53:15 5 because it's possible to get diminished consumer
12:53:18 6 surplus; that is, diminished use in enjoyment from a
12:53:22 7 place that you attend, and so the use by itself
12:53:26 8 doesn't give you a valid measure either of the impact
12:53:30 9 on use value or of the impact on total value.
12:53:35 10 Q. I think you may have misspoken. My
12:53:35 11 question was: Wouldn't you expect a relationship
12:53:39 12 between use and water quality?
12:53:43 13 MS. XIDIS: Objection to form.
12:53:45 14 A. Yes.
12:53:46 15 Q. (BY MR. DEIHL) You would expect a
12:53:48 16 relationship?
12:53:50 17 A. In general, subject to qualifications.
12:53:52 18 For example, people may not perceive a change in water
12:54:00 19 quality and therefore there is no change in behavior.
12:54:07 20 Q. How did you approach respondents to the
12:54:11 21 final survey document to ask them to participate in
12:54:16 22 the survey?
12:54:20 23 A. If you mean how did we select them, that
12:54:26 24 is described.
12:54:26 25 Q. Yeah. I'm not asking how you selected

them. I'm asking you how you contacted them and what you said to them to get them to participate.

A. I believe that is described in the report and that is an aspect of the survey in which I had minimal involvement, and so the best person -- the best people to ask that question is -- are Roger Tourangeau and Jon Krosnick.

Q. You indicated earlier that if a person thought there wasn't a water quality problem, they would just say no or not vote for the bid amount.

MS. XIDIS: Objection to form.

A. If a person thought that there was no problem or it was a small problem or for any other reason it wasn't worth his spending money, his paying high taxes for that, he would vote no.

Q. (BY MR. DEIHL) Isn't it possible that a respondent would have refused to participate in the whole survey because he thought there wasn't a problem with water quality?

A. Respondents didn't know that this was a survey about water quality at the time they agreed to participate.

Q. What did respondents know about the survey when they were asked to participate?

A. You know, I believe they received a

letter soliciting their participation. I don't recall what the letter said.

Q. Okay. So we could take a look at that letter and we would know whether they were told about water quality or not?

A. Yes.

Q. Now, earlier we were talking about your observations of focus groups, and you indicated that you could tell that the injury resonated with participants. I take it that's based on your observing these focus groups?

A. Yes.

MS. XIDIS: Objection to form.

Q. (BY MR. DEIHL) How do you square that observation on your part with the data that indicates that use of these resources has increased dramatically since the early 1960s?

MS. XIDIS: Objection to form.

A. What data are you referring to and what is the nature of the dramatic increase?

Q. (BY MR. DEIHL) There is data from both the Army Corps of Engineers and State of Oklahoma on use of these.

A. No, I understand, but I don't know what numbers you are talking about. I don't know what

12:57:46 1 years you are talking about, so I don't know what
12:57:48 2 the --
12:57:48 3 Q. So without that, you can't answer the
12:57:50 4 question?
12:57:52 5 A. That's right.
12:57:52 6 Q. Okay. Do you know whether the use has
12:58:00 7 increased since the 1990s?
12:58:07 8 A. I think there was an increase in recent
12:58:11 9 years in the 2000s, but I don't recall. I have
12:58:20 10 skimmed Dr. Desvousges' report and Professor Rasser's
12:58:22 11 (phonetic) report, but only skimmed it. I've been
12:58:26 12 traveling most of the time since it was submitted at
12:58:31 13 the beginning of April, but I seem to remember one
12:58:33 14 table which showed a large change in recreation
12:58:37 15 between 2000 and 2005 or some such years, so I'm not
12:58:43 16 offhand familiar with what happened since the 1990s.
12:58:50 17 Q. How were the bid vectors chosen in the
12:59:00 18 final survey document?
12:59:01 19 A. Well, they were chosen by the team
12:59:11 20 starting with suggestions from Barbara Kanninen with a
12:59:15 21 team discussion. That's just a summary of the
12:59:16 22 process. Let me say what about the economic
12:59:18 23 principles. Well --
12:59:20 24 Q. Let me interrupt you, if I could. You
12:59:22 25 said starting with a suggestion of Barbara Kanninen.

12:59:24 1 Tell me about that.
12:59:28 2 A. Well, Barbara was brought in to help with
12:59:35 3 the bid design and so she considered survey results,
12:59:39 4 and my recollection, but I may be -- it may be flawed,
12:59:45 5 is there was a conference, a conference call or series
12:59:50 6 of conference calls, and she suggested certain bids,
13:00:00 7 maybe other members of the team also suggested certain
13:00:03 8 bids. There certainly was a discussion in which
13:00:07 9 members of the team, myself included, participated,
13:00:09 10 and that led to the -- that discussion concluded with
13:00:16 11 the determination of the bids that we used.
13:00:20 12 Q. How was the $405 top bid selected?
13:00:24 13 A. Through that same -- through that
13:00:28 14 process. That was part of the set of bids that was
13:00:30 15 selected.
13:00:30 16 Q. You hadn't pretested the $405 top bid,
13:00:33 17 had you?
13:00:35 18 A. I don't recall.
13:00:39 19 Q. You described a conference call or
13:00:41 20 perhaps more than one conference call in which the
13:00:43 21 team discussed the bids. How long did it take for the
13:00:48 22 team to generate this bid design or bid vector?
13:01:00 23 A. You know, I can't remember precisely.
13:01:07 24 There was a limited period between when we completed
13:01:13 25 the second pilot and got data from it and looked at it

13:01:20 1 and needed to submit the questionnaire to Wesat for
13:01:24 2 coding. I can't -- but as I sit here now, I don't
13:01:30 3 remember what exactly that time period was.
13:01:41 4 Q. When you refer to the second pilot, if
13:01:45 5 you would take a look on page 3-7. Does that provide
13:01:48 6 the dates of the second pilot?
13:01:52 7 A. Yes.
13:01:54 8 Q. And that would be the pilot you are
13:02:00 9 referring to?
13:02:00 10 A. Yes.
13:02:03 11 Q. So you took information that you received
13:02:05 12 in that piloting process, which ended on July 30,
13:02:09 13 2008, then you considered that and you used that
13:02:13 14 information in preparing the final bid design?
13:02:18 15 A. I think that's correct. Let me say this:
13:02:22 16 I think Dr. Kanninen has described and maybe some of
13:02:26 17 the other members of the team in more specific detail
13:02:31 18 what -- the information that was used. In particular
13:02:35 19 Dr. Kannien has told you the information that we
13:02:39 20 provided her, which was the basis for her thinking
13:02:43 21 about this and also our team discussion, and so I
13:02:48 22 don't want to paraphrase what she said, because I
13:02:52 23 don't remember exactly what she said, but she will
13:03:00 24 have given you a precise description of the
13:03:03 25 information that the team looked at in formulating the

13:03:07 1 bids to use in the final survey.
13:03:09 2 Q. And you would defer to Dr. Kanninen's
13:03:11 3 description of that process?
13:03:16 4 A. Yes.
13:03:16 5 Q. Dr. Kanninen wasn't involved in the team
13:03:20 6 when you were engaged in this focus group process,
13:03:26 7 correct?
13:03:26 8 A. Yes.
13:03:28 9 Q. And she wasn't on the team when you were
13:03:31 10 pilot testing either during the first pilot test or
13:03:33 11 the second pilot?
13:03:35 12 A. That's correct.
13:03:35 13 Q. And you were using bids in those
13:03:41 14 processes, right?
13:03:41 15 A. That's correct.
13:03:43 16 Q. Okay. So you used a bid, for example, as
13:03:45 17 part of the second pilot test?
13:03:46 18 A. Yes.
13:03:48 19 Q. When I say "a bid," you actually used a
13:03:50 20 series of bids, right?
13:03:50 21 A. That's what I understood you to mean.
13:03:52 22 Q. Okay. What was the purpose of using
13:04:01 23 different bid amounts in the various pilots and in the
13:04:05 24 focus groups?
13:04:11 25 A. I'm not quite sure what you mean by "what

was the purpose"?

Q. Why did you test different bid amounts?

A. To answer that maybe I can explain the principles by which one develops bid amounts, because that will -- may make this more transparent. There is a well-developed body of theory in econometrics in general that underlies the determination of bid amounts, not just for contingent valuation, but for biological experiments, because there is a perfect analogy between many biological experiments, dose-response experiments, as they are called, and what we are dong here, so the theory was originally developed by biometricians in that literature, and it was applied by Barbara Kanninen under my direction to the contingent valuation literature to deal with some of the distinctive statistical features of the distributions that we use in contingent valuation.

The principle is this: You are trying to estimate a parameter -- I'm using jargon here -- a parameter of a distribution like a mean or a median, and in our context the relevant distribution is what's called a willingness-to-pay distribution and in a biological context, it could be a life distribution or some other, but mathematically these two things were analogous.

13:05:50 1 The preferred way to -- the preferred
13:06:00 2 bids are based on what the researcher believes the
13:06:07 3 true distribution to be. In this type of model, what
13:06:15 4 econometricians called a nonlinear module, you get
13:06:18 5 into a paradox. The paradox is if you knew the true
13:06:22 6 distribution, there would be no need to collect data
13:06:26 7 from which you estimate the distribution. You could
13:06:28 8 just go home, have a beer and relax. The problem is
13:06:31 9 you don't know the true distribution, and the paradox
13:06:35 10 is then you don't know how to select the bids, whether
13:06:41 11 they are doses in the dose-response experiment or bids
13:06:43 12 in a CV. And the way you resolve that paradox is you
13:06:48 13 use your best estimate of that time -- at that time of
13:06:52 14 the distribution, but realizing that it's not the
13:07:00 15 final estimate and it's only a preliminary estimate.
13:07:03 16 And that preliminary estimate will be based on studies
13:07:09 17 you have done to that point, which will be
13:07:11 18 preliminary.
13:07:13 19 So the principle is you look at what you
13:07:15 20 know at this point of the distribution and you are
13:07:20 21 looking at somewhat outer points of the distribution,
13:07:24 22 and that's the basis -- that's how you set the bids.
13:07:33 23 And typically precisely because you don't know the
13:07:37 24 true distribution, you hedge your bets by maybe making
13:07:41 25 two or three guesses at the -- two or three different

guesses at the distribution and that will give you two or three different guesses at outer points, sort of on the low side or the high side.

So that's the accepted process in the literature. And as I say, it applies in a wide range of fields outside environmental economics, because mathematically the structure of the problem is the same, and that was the general approach we applied here. We did it loosely, but we did something -- we followed it with the first pilot and the second pilot, but when it came time to go into the field, we wanted Barbara Kanninen, who has done some of the major research in this area to sort of pay close attention and to fine-tune it and to participate in the discussion, and so were doing this in a more informal manner prior to the final survey, and we had a more considered analysis with Barbara Kanninen's input when going -- when finalizing the survey for the field.

Q. But several of your focus groups in the first pretest involved a five-year tax as compared to a one-year tax in the final survey. How can you compare the five-year results to a one-year result?

A. Well, we paid -- let me back up. I mentioned to you that Dr. Kanninen described the information that was presented to her and I read her

13:09:28 1 deposition yesterday, last night, and I don't today
13:09:33 2 remember exactly what that information was. I think
13:09:37 3 it involved the second pilot and some other data, but
13:09:41 4 I don't remember exactly. But my impression was that
13:09:46 5 was the most recent data on the whole, you know, at
13:09:50 6 that point of time, and to the extent that was earlier
13:09:54 7 data, we didn't use it. The reason we weren't using
13:10:03 8 it is precisely that it was less recent and we had
13:10:09 9 more information which was what was fed into that
13:10:13 10 determination.
13:10:18 11 Q. You yourself weren't involved in writing
13:10:22 12 a computer program or an Excel spreadsheet or anything
13:10:26 13 like that that generated the bid design in this case?
13:10:30 14 A. No.
13:10:30 15 MS. XIDIS: Objection to form.
13:10:31 16 Q. (BY MR. DEIHL) Do you know if anyone
13:10:31 17 wrote a computer program or an Excel spreadsheet that
13:10:35 18 generated the bid design?
13:10:39 19 A. I don't.
13:10:39 20 Q. Did you look at bid levels in other
13:10:43 21 surveys to help formulate the bid vector in this
13:10:48 22 survey?
13:10:50 23 A. No, and let me emphasize it wouldn't
13:10:52 24 help. That's, if I may say so, an off-the-wall idea,
13:11:01 25 because the whole principle to apply -- the whole

13:11:07 1 principle is to base the bid design on your estimate,
13:11:11 2 your best estimate at that time of the distribution
13:11:15 3 that you are trying to measure with precision, and
13:11:18 4 so -- and we are talking specifically of
13:11:22 5 willingness-to-pay distributions of particular
13:11:24 6 populations for particular items.
13:11:26 7 The bid design in some other study would
13:11:31 8 be based on the best estimate at that time of those
13:11:33 9 researchers of the distribution of that population for
13:11:35 10 that item and that gives you precisely no information
13:11:41 11 of the -- about the willingness-to-pay distribution of
13:11:45 12 this population for this item, assuming these are
13:11:48 13 different items -- you know, very different items and
13:11:50 14 population. So it would give -- it would be, to put
13:11:54 15 it simply, absolutely stupid to look at other bids and
13:12:00 16 say, Gee, they used $320 so we should use $320. It
13:12:07 17 makes no sense, given the statistical theory of
13:12:11 18 nonlinear estimation and bid design.
13:12:16 19 Q. Is it possible to compare the
13:12:16 20 willingness-to-pay numbers between different
13:12:22 21 environmental goods, say, for example, the
13:12:24 22 willingness-to-pay number to clean up Tenkiller Lake
13:12:28 23 to the willingness-to-pay number to, you know, clean
13:12:31 24 up the California coast from oil spills or whatever?
13:12:35 25 I'm just picking --

13:12:37 1 A. I understand.
13:12:37 2 MS. XIDIS: Objection to form.
13:12:39 3 A. The short answer is probably not, and let
13:12:43 4 me emphasize. These are different populations that
13:12:48 5 bear different relationships. These are different
13:12:52 6 resources, different populations, and the population
13:13:00 7 may bear a different relationship to the resource in
13:13:03 8 question, and so it winds up being apples and oranges.
13:13:11 9 It's at the end of the day like comparing the demand
13:13:15 10 for umbrellas in May with a demand for shorts in
13:13:20 11 southern California. Different people, different
13:13:20 12 commodities. You know, it may turn out similar or it
13:13:22 13 may not, but because these are apples and oranges, you
13:13:26 14 don't really know how to proceed.
13:13:30 15 Q. (BY MR. DEIHL) We talked a little bit
13:13:31 16 this morning about whether or not what you were
13:13:33 17 valuing in this survey was a normal good. Was what
13:13:39 18 you were valuing in this survey a normal good in your
13:13:41 19 opinion?
13:13:43 20 A. Let me just look at one thing. We found
13:14:15 21 in the regression equation described in Section 6.5.
13:14:18 22 I'm looking at page 6-25. Income was one of the
13:14:26 23 variables. It's page 6-25. And on page 6-27, we
13:14:35 24 state the finding that as income increased overall --
13:14:41 25 in general voting for the program increased, so that

would be consistent. The normal good in this context is a term of art and it could actually have two different meanings. It's used -- it could be used to say, Will the demand for the commodity increase if there were a demand function for the commodity? It could also mean would the willingness to pay for the commodity increase, and essentially the answer is we found in both censuses that it does increase overall.

Q. You indicated a moment ago that you -- I don't recall the word you used, but it was a strong word, that you would not look to other surveys to pick the bids for this particular survey. My question is: When you do the sort of meta-analyses that researchers like yourself do, don't you use results from various studies to draw inferences about general relationships across different commodities?

MS. XIDIS: Objection to form.

A. You draw inferences, but about something different. That is, meta-analyses typically are comparisons of meta-analyses of the mean, willingness to pay or whatever the variable is. The essence -- the essential thing in bid design for nonlinear estimation is to know something about the tails of the distribution, and that's something different and that's why meta-analysis -- that's why these are just

two different things.

Q. (BY MR. DEIHL) You mentioned that earlier that what you are looking at when you are putting together this bid design is, I think you said, the outer points. Why are you looking at the outer points?

A. Well, I'll answer it, but let me emphasize. I meant to infer quotation marks. They are somewhat outer points, but not -- by an outer point and not an outer point. What I mean is this: The sort of points you look for are loosely something like the 20 percentile point and the 80 percentile point, something like that. So they are not the 1 percent point and the 99 percent point or something like that, but 80 and 20 or 25 and 75 point or something, so they are some way out, but not all the way out.

Q. And why are you looking at those points?

A. Well, it's been proved -- this is where there is a body of theory on optimal design, and what comes out of the theory -- what comes out of the theory in general is that it's those points which give you the best estimate of the parameters of the distribution, best estimate by some particular criteria relating to the tightness of the estimate

13:18:09 1 that you would get. There is a body of theory and
13:18:13 2 Barbara Kanninen contributes to that theory in her
13:18:16 3 dissertation, so that's exactly a topic she worked on.
13:18:20 4 And I should add Barbara and I have
13:18:22 5 written what has for long been considered the sort of
13:18:26 6 text on the statistical analysis of contingent
13:18:28 7 valuation data and she has elaborated on that in our
13:18:30 8 joint chapter.
13:18:35 9 Q. And you said the statistical
13:18:35 10 evaluation --
13:18:35 11 A. Analysis contingent valuation data.
13:18:39 12 Q. Does that have anything to do with
13:18:41 13 creating a proper bid design?
13:18:43 14 A. That's one of the aspects. The bid
13:18:45 15 design is one of the aspects of the statistical
13:18:48 16 analysis of contingent valuation data.
13:18:52 17 Q. Okay. Did you explain in your report how
13:19:00 18 you went about choosing this bid vector?
13:19:22 19 A. As I sit here just -- I don't believe
13:19:26 20 that is described in the text of this report.
13:19:48 21 Q. You said a moment ago that you try to
13:19:50 22 focus on the 20 percent/80 percent mark or
13:19:54 23 25 percent/75 percent point in the distribution when
13:20:03 24 trying to obtain an optimal bid design. Did I get
13:20:07 25 that right?

13:20:07 1 A. Yes, I said that.
13:20:11 2 Q. In your -- in the results of this survey,
13:20:15 3 there is still a pretty high percentage of people
13:20:16 4 saying yes at the $405 bid amount, isn't there?
13:20:22 5 MS. XIDIS: Objection to form.
13:20:26 6 A. Let me look. Yes. There is 34 percent,
13:20:43 7 so, yes.
13:20:46 8 Q. (BY MR. DEIHL) How do you know or what
13:20:48 9 makes you think that you've captured the underlying
13:20:52 10 distribution based on those results?
13:20:54 11 A. Well, I emphasized that the information
13:21:01 12 you use is preliminary because you are trying to --
13:21:05 13 you are trying to -- you are choosing bids to estimate
13:21:11 14 a distribution and to do that, you would need to know
13:21:15 15 the distribution, and so you are using both
13:21:16 16 preliminary information and typically information on a
13:21:20 17 much smaller sample than the information that you will
13:21:24 18 use to do the estimation, because whether it's a pilot
13:21:28 19 or whatever, it comes from a smaller sample. So it's
13:21:33 20 not at all a surprise that in the end, the
13:21:37 21 distribution you get having done the larger survey is
13:21:41 22 somewhat different from the preliminary distribution
13:21:46 23 that you used, and so what might have been thought of
13:21:50 24 as a 25 or 30 percent quantile is a 35 percent
13:22:00 25 quantile.

13:22:01 1 Q. That's because, again, your survey is
13:22:05 2 simply estimating the willingness to pay of all the
13:22:09 3 residents of Oklahoma with the exception of those
13:22:11 4 western counties, right?
13:22:13 5 A. Well, but I'm saying you're working off
13:22:15 6 of a small sample. Not just a small sample, but the
13:22:18 7 pilots are not -- I think, first of all, Dr.
13:22:30 8 Tourangeau described this accurately, and I may get
13:22:33 9 the term of art wrong, but the pilots were not a
13:22:39 10 probability sample. They were less than a probability
13:22:43 11 sample because that's part of the circumstances, you
13:22:48 12 are doing this in a limited time frame. So it's not
13:22:52 13 just they were smaller, but it's a less representative
13:23:00 14 sample, shall we say, than the main sample, so there
13:23:03 15 are two points of difference. That's why it's not a
13:23:07 16 surprise that the distribution you get with a large
13:23:09 17 probability sample is different from the distribution
13:23:13 18 you had from sort of small, nonprobability -- smaller
13:23:16 19 nonprobability samples.
13:23:18 20 Q. How do you know that the bid distribution
13:23:18 21 in this survey is correct if you never measured beyond
13:23:26 22 the $405 bid amount?
13:23:31 23 A. I think you're conflating several things.
13:23:37 24 We have a very good estimate from this of the
13:23:39 25 quantiles covered here from the 80 -- whatever it is,

13:23:43 1 81 percentile to the 34 percentile. We don't know
13:23:46 2 what the other outer parts of the distribution will
13:23:50 3 look like because we didn't measure them. But we sort
13:24:00 4 of insulate -- we insulate the estimation by a very
13:24:03 5 conservative procedure, which has the nature that it
13:24:07 6 doesn't matter that we don't know what those outer
13:24:11 7 parts are because we make the most conservative
13:24:13 8 possible assumption with regard to them, so we have
13:24:18 9 high confidence in sort of part of the distribution
13:24:22 10 from the, whatever it is, 82 percentile to the 35
13:24:24 11 percentile.
13:24:37 12 Q. Do you know what the highest bid you
13:24:39 13 pretested was?
13:24:43 14 A. I don't remember.
13:24:46 15 Q. Based on published literature about
13:24:54 16 optimal bid design, is this an optimal bid design?
13:25:01 17 A. Yes, because it conforms exactly to
13:25:03 18 what's the standard practice. You have a preliminary
13:25:09 19 estimate of the distribution, you take bid points from
13:25:15 20 these outer quantiles of the sort I've described. You
13:25:20 21 in fact use more than a two-point design to reflect
13:25:24 22 uncertainty about where exactly that distribution is,
13:25:28 23 but what we did conforms exactly to the well-accepted
13:25:35 24 practice, not only in contingent valuation, but in
13:25:37 25 designing dose-response experiments generally and

13:25:39 1 biometrics and marketing and elsewhere.
13:25:43 2 Q. Why is there no discussion of the bid
13:25:46 3 design in your report?
13:25:48 4 A. I don't know.
13:25:54 5 Q. Let's talk hypothetically for a moment.
13:26:01 6 A. Certainly.
13:26:01 7 Q. Hypothetically, if your bid schedule
13:26:03 8 dropped the $405 bid, what would happen to your
13:26:07 9 estimate of willingness to pay?
13:26:09 10 MS. XIDIS: Objection to form.
13:26:13 11 A. You are saying if the bid had been a
13:26:15 12 lower amount?
13:26:16 13 Q. (BY MR. DEIHL) Let's say, you know,
13:26:16 14 instead of your six-point bid schedule, you had a
13:26:20 15 four-point bid schedule and it went like something
13:26:24 16 10/45, 80/125.
13:26:26 17 MS. XIDIS: Objection to form.
13:26:28 18 A. We would -- with this sample, we would
13:26:31 19 recover. We would learn about a smaller fraction of
13:26:35 20 the distribution.
13:26:37 21 Q. (BY MR. DEIHL) Some people who had said
13:26:41 22 no at, say, 405 would say yes at 125, for example?
13:26:46 23 MS. XIDIS: Objection to form.
13:26:48 24 A. I mean, the way I would put it is, let's
13:26:52 25 say instead of knowing the range of the distribution,

13:26:54 1 I mean the portion of the distribution from 82 percent
13:27:01 2 to 35 percent, we would know the distribution from
13:27:05 3 82 percent to 62 percent.
13:27:09 4 Q. (BY MR. DEIHL) Wouldn't you just have a
13:27:11 5 completely different set of data if I used that
13:27:13 6 four-point bid structure?
13:27:15 7 MS. XIDIS: Objection to form.
13:27:16 8 A. No, you wouldn't. You would have four
13:27:20 9 data points instead of six data points. You would
13:27:22 10 have those four data points, but you wouldn't know
13:27:28 11 anything to the right of it. You wouldn't know what
13:27:30 12 distribution looked like at higher amounts.
13:27:31 13 Q. (BY MR. DEIHL) So it would be a
13:27:33 14 different dataset?
13:27:35 15 A. Well, what I'm getting at is -- and maybe
13:27:39 16 this is whether the bottle is half full or half empty.
13:27:43 17 When you do this, you recover a portion of the
13:27:46 18 distribution if you think of the distribution going
13:27:48 19 from 1 percent to 99 percent, whatever, and you would
13:27:52 20 recover, you would learn a smaller portion of the
13:28:00 21 distribution. You would learn -- and so in a sense
13:28:05 22 it's the same distribution and it's the same four
13:28:07 23 points, but you only know what the distribution looks
13:28:11 24 like over this range instead of over this range, so
13:28:15 25 it's the sense in which it's the same distribution,

but it's as though it's masked and it's masked more in one case than the other, so you see a smaller window of it.

Q. Wouldn't it rely -- wouldn't it result in a lower willingness-to-pay number?

MS. XIDIS: Objection to form.

A. To answer your question precisely, we are using a very conservative estimate of the mean of the distribution, which is lower bound on that mean on which it approaches. That is, it underestimates the distribution, and the less -- the smaller the window of the distribution that you know, the greater the underestimation, so it would lead to a lower -- lower-bound mean.

Q. (BY MR. DEIHL) In connection with this survey, how did you deal with re-weighting the probabilities when the cumulative distribution function did not exhibit monotonicity?

MS. XIDIS: Objection to form.

A. We applied the ABERS estimator, which is the standard and well accepted method -- well accepted in the statistical literature for imposing monotonicity. Again, let me emphasize, the approach for imposing monotonicity, not just in contingent valuation, but in the wide field where people estimate

models with a discrete dependent variable like that here, so it's biometrics and marketing in many other areas.

Q. Did you take the higher bid in your computation?

A. I'm sorry, I don't quite know what you mean by this. What we did is shown in one of these pictures. What we did is shown in Figure 7.1.

Q. What page are you on, please?

A. 7-4.

Q. Explain to me what you did in Figure 7.1, please.

A. The way to understand what we did is to compare two tables, Table 6.1 on page 6-2 with Table 7.1 on page 7-4. The Table 6.1 is the original data, which is not monotonic, that is, between $80 and $125. The difference between those two percentages is not statistically significant, but the two-point estimates are not monotonic. And Table 7.1 shows you what the ABERS estimator calls for, which is you pool the data at that point and look at the combined percentages of yes, and the combined percentages of yes of those becomes 60.9, which is the combination of 60.2 and 61.5. And that's exactly what the statistical literature says you are supposed to do. That's

13:33:00 1 exactly the approach in the peer-reviewed literature.
13:33:16 2 Q. Did you estimate the responsiveness of
13:33:20 3 your yes answers to changes in the bid levels?
13:33:26 4 A. I'm not sure what you mean by that
13:33:30 5 question. Let me just consult something. What we did
13:33:54 6 in that regard is described in Section 6.5. If you
13:34:05 7 look at page -- which is a logit regression model.
13:34:13 8 One of the variables described at the top of page 6-25
13:34:16 9 is the cost of the program, and what we found is
13:34:20 10 described on page 6-27, which is that we found that
13:34:24 11 the probability of voting for the program decreased as
13:34:30 12 the price -- as the cost of the program increased.
13:34:33 13 (Deposition Exhibit 7 was marked.)
13:35:31 14 Q. Dr. Hanemann, I've handed you what's been
13:35:35 15 marked as Deposition Exhibit No. 7. Can you identify
13:35:37 16 this document for me?
13:35:41 17 A. It's an article entitled "Valuing the
13:35:43 18 Environment Through Contingent Valuation," which I
13:35:46 19 wrote and which was published in the Journal of
13:35:48 20 Economic Perspectives, which is one of the major
13:35:52 21 journals put out by the American Economic Association
13:35:54 22 in the fall of 1994.
13:36:01 23 Q. Take a look at page 21 of this article,
13:36:05 24 please. Do you see the heading on page 21 "Conducting
13:36:15 25 Reliable Surveys"?

13:36:16 1 A. I see that heading.
13:36:18 2 Q. Are the characteristics of a reliable
13:36:22 3 survey that you describe in this article you wrote
13:36:26 4 still relevant?
13:36:28 5 A. Well, let me take a minute. It's 15
13:36:30 6 years since this was written, and so let me look at
13:36:35 7 it.
13:36:35 8 Q. Do you need a minute to read through?
13:36:37 9 A. Yes, I do, please.
13:36:39 10 MR. DEIHL: Why don't we go off the
13:36:39 11 record for a minute and let Dr. Hanemann read through
13:36:39 12 this.
13:36:41 13 THE VIDEOGRAPHER: Going off the record.
13:36:43 14 The time is 1:36.
13:36:45 15 (Recess taken, 1:36 p.m. to 1:50 p.m.)
13:49:52 16 THE VIDEOGRAPHER: Back on the record.
13:50:24 17 The time is 1:50.
13:50:30 18 THE DEPONENT: Could you repeat the
13:50:30 19 question?
13:50:31 20 Q. (BY MR. DEIHL) Sure. Before we took a
13:50:33 21 break to allow you to review your 1994 article, I had
13:50:39 22 asked you if the characteristics of a reliable survey,
13:50:43 23 which you describe in this article, particularly
13:50:46 24 beginning on page 21 where there is a heading that
13:50:48 25 states "Conducting Reliable Surveys," if that

information that you describe is still relevant today?

A. The answer is yes, in general it is. Let me quickly -- in going through this. I think I counted 17 items, which I'll mention quickly. Using a probability sample, avoiding a self-administered survey; having the interview occur at a setting that permits respondents to reflect, such as their home; confronting subjects with a specific and realistic situation; using a closed-ended question.

"The scenario providing for the commodity may be real; if not, the key is to make it seem real to respondents. There should be a clear sense of commitments." And the closed-ended format where possible with a voting context; providing adequate and accurate information; making the survey balanced, insulating it from any general dislike of big business; reminding respondents of the availability of substitutes; facilitating "don't know" responses; allowing respondent to reconsider legitimating a negative response by having the interviewer say something like, We have found that some people vote for the program and others vote against it and then giving reasons to vote against it; having a debriefing of the respondents; having a debriefing of the interviewer using a non-parametric estimate of the

13:52:33 1 mean; that is, the low-bound estimate using optimal
13:52:39 2 experimental designs; other essential ingredients are
13:52:43 3 relentless attention to detail and rigorous testing of
13:52:48 4 the instrument. And I think all of those apply today
13:52:54 5 and were exhibited in this survey.
13:53:03 6 There is one -- except there is one item
13:53:07 7 I should mention, which has to do with "don't know"
13:53:13 8 responses. I refer to facilitating them and we
13:53:16 9 certainly allowed them for the reasons we laid out in
13:53:20 10 the report and for the reasons Jon Krosnick explained,
13:53:24 11 I believe, in his deposition. We felt, given
13:53:30 12 information, given what's been learned in survey
13:53:33 13 research since 1994, including but not limited to his
13:53:39 14 own work, the feeling was that it was more
13:53:45 15 conservative and more desirable not to have an
13:53:46 16 explicit "don't know" option, but certainly to accept
13:53:50 17 "don't know" responses.
13:53:52 18 But the elements that I have listed I
13:53:54 19 think are valid today and I also think they are
13:54:05 20 exhibited in the survey that we have conducted here.
13:54:09 21 Q. If you could turn to page 24 of your
13:54:13 22 article, please.
13:54:13 23 A. Yes.
13:54:15 24 Q. In the middle of that page is a paragraph
13:54:18 25 that begins "A recent innovation, considered essential

by the NOAA Panel, is a debriefing section at the end of the survey. This checks respondents' understanding and acceptance of key parts of the contingent valuation scenario." Why, in your opinion, did the NOAA panel consider a debriefing section essential?

A. I will look at the report and -- well, the word "essential" is mine and not theirs, but they list -- one of the items that they list is "checks on understanding acceptances." That's what I'm referring to. And they say, "Since CV interviews" -- I'm reading from the NOAA panel report, and this is -- this is not an image of the federal register, but it's the text of the federal register showing the pages.

"Since CV surveys are -- interviews often present information that's new to respondents, the questionnaire should attempt at the end to determine the degree to which respondents accept as true the descriptions given and assertions made prior to the valuation question. Such an inquiry should be carried out in detail, but none directively so that respondents feel free to reject any part of the information they were given at earlier points."

Q. Did the CV survey conducted for this matter include debriefing questions?

A. Yes, it did.

13:57:20 1 Q. What topics did the debriefing questions
13:57:24 2 cover?
13:58:13 3 A. The debriefing questions are as I'll read
13:58:16 4 in Section 7, which starts at page A-21 and include
13:58:26 5 25, "After the spreading of litter is banned, how
13:58:31 6 serious did you think the effects of algae in the
13:58:35 7 river would be?" 26 is the same thing for the lake.
13:58:37 8 27, "Did you think the alum treatments would be done
13:58:43 9 only if a court bans the spreading of the litter?"
13:58:45 10 28, 29, 30, and 31, 32, 33, 34, 35, 36.
13:59:11 11 Q. Those are what you would consider the
13:59:13 12 debriefing questions in this survey?
13:59:18 13 A. Those are the debriefing questions of the
13:59:20 14 respondent, and then there are also debriefing
13:59:24 15 questions of the interviewer.
13:59:28 16 Q. Going back to your 1994 article for a
13:59:30 17 moment, a little further down on the page on page 24
13:59:35 18 in that same paragraph, at the end of that paragraph,
13:59:39 19 there is a line that begins, "This information can be
13:59:46 20 exploited." Do you see that?
13:59:46 21 A. Yes.
13:59:46 22 Q. Could you read that sentence and the
13:59:50 23 following sentence to the end of that paragraph aloud
13:59:52 24 into the record, please.
13:59:54 25 A. Sure. "This information can be exploited

14:00:00 1 in the data analysis. One can monitor for
14:00:03 2 misunderstandings, measure statistically how they
14:00:05 3 affected respondents' willingness-to-pay, and adjust
14:00:09 4 accordingly. For example, if a subject who voted
14:00:11 5 'yes' appeared to be valuing something different than
14:00:13 6 the survey intended, this can be dropped or the 'yes'
14:00:18 7 converted to a 'no.'"
14:00:20 8 Q. Did you monitor how misunderstandings
14:00:22 9 affected willingness to pay in your survey?
14:00:26 10 A. Yes.
14:00:26 11 Q. Did you adjust accordingly?
14:00:30 12 A. We present an adjustment, yes.
14:00:33 13 Q. Did you drop or recode any respondents
14:00:33 14 when calculating the final willingness-to-pay number
14:00:37 15 on which the damage estimate is based?
14:01:00 16 A. We show that if you made that
14:01:01 17 adjustment -- so I'm referring in particular to
14:01:07 18 adjustments described in Section 6.7.2 on page 6-35 of
14:01:16 19 the report. And that section does the sort of things
14:01:26 20 I was referring to in the text that you asked me to
14:01:30 21 read out a moment ago. Section 6.7.2 is measuring
14:01:37 22 statistically how these issues affected respondents'
14:01:41 23 willingness to pay. And then if you turn to Appendix
14:01:46 24 G-4 -- I'm sorry, Appendix G, and I just pulled that
14:01:52 25 out as a separate piece, but it's in the second big

14:02:01 1 volume.
14:02:11 2 Q. Okay.
14:02:11 3 A. So that's page G-4 and it's Section G.4,
14:02:15 4 and it's table -- the table on that page G.2. If you
14:02:26 5 look at the third row, when you apply the adjustments
14:02:33 6 that are made in Section 6.7.2, which is this, and you
14:02:39 7 make changes of the sort described in the text that
14:02:43 8 raises the -- that changes the estimated probabilities
14:02:48 9 of yes at the various bid points, and then when you
14:02:52 10 calculate the lower-bound mean in the same way we had
14:02:54 11 done, that estimate is $211.
14:03:13 12 Q. Explain to me how you arrived at that
14:03:16 13 $211 number. What responses did you change to arrive
14:03:22 14 at that number?
14:03:35 15 A. Well, if you turn back two pages in
14:03:37 16 Section G to page G-2, Section G-2, we change
14:03:50 17 responses so that if respondents believe that the
14:04:00 18 program might be carried out even if the ban isn't
14:04:05 19 implemented, we change that belief to be that the
14:04:11 20 program would not be carried out.
14:04:13 21 Secondly, if respondents thought that the
14:04:18 22 natural recovery of the river and lake would take some
14:04:22 23 other amount of time, we changed that belief to --
14:04:30 24 that it would take the amount of time and so on, and
14:04:33 25 we looked at how that would change the probability of

14:04:37 1 voting if these beliefs were changed, so with a
14:04:45 2 different set of beliefs, it would affect how they
14:04:46 3 voted, and we predicted -- we predicted how they would
14:05:00 4 vote but with those different beliefs and then we
14:05:01 5 looked at what that would imply for the overall
14:05:05 6 distribution of willingness to pay in the sample, and
14:05:13 7 we calculated the lower-bound mean in the same way
14:05:16 8 that we did in the estimate of whatever it is, $184.
14:05:18 9 Excuse me for being imprecise, but the estimate -- we
14:05:26 10 did this in the same way that we did in Section 7
14:05:33 11 which leads to an estimate, which I can't find, but
14:05:43 12 it's given here as $184.55.
14:05:48 13 Q. Going back to page G-2, there is an entry
14:05:52 14 that "Tax used to clean other rivers and lakes."
14:06:00 15 A. Yes.
14:06:00 16 Q. That's an indication of those respondents
14:06:01 17 who thought that other lakes and rivers would be
14:06:05 18 cleaned up in addition to Lake Tenkiller; is that
14:06:09 19 correct?
14:06:09 20 A. Yes.
14:06:11 21 Q. Did you recode those responses to -- did
14:06:15 22 you recode those responses?
14:06:18 23 A. We predicted what their responses would
14:06:20 24 be if they didn't think that this would -- that these
14:06:28 25 tax funds would be used to clean up other lakes.

14:06:30 1 Q. Say that again. You predicted --
14:06:31 2 A. We changed -- we didn't use their actual
14:06:35 3 responses. We used the responses we predicted they
14:06:37 4 would make if they had believed that the tax funds
14:06:41 5 would not be used to clean up other rivers and lakes.
14:06:45 6 Q. What about those respondents who believed
14:06:48 7 that the tax funds would be used to clean up other
14:06:50 8 rivers and lakes?
14:06:50 9 A. No. Those are the people whose responses
14:06:52 10 we recoded, we changed.
14:06:52 11 Q. Okay. And where is the result of that
14:07:00 12 recoding?
14:07:00 13 A. No. I mean, we -- it's embodied in
14:07:07 14 the -- it's embodied in the proportions of yeses, and
14:07:16 15 the -- so the revised proportion of yeses is shown on
14:07:26 16 the first page of Section G, Table G-1, in the column
14:07:33 17 labeled "Proportion of votes adjusted for scenario
14:07:37 18 acceptance and certainty."
14:07:41 19 Q. Okay. Explain to me what that column
14:07:43 20 represents, a portion of those adjusted for scenario
14:07:46 21 acceptance and certainty.
14:07:48 22 A. So if people -- the first column is the
14:07:52 23 proportion -- is the actual votes.
14:07:54 24 Q. Yes.
14:08:00 25 A. And then we predict what the votes -- so

we take somebody who voted whether yes or no, but thought that the money would be spent for other rivers and we predict how he would vote if he didn't believe that the funds would be used for other rivers.

Q. And how did you predict he would vote?

A. We predicted how he would vote using the regression equation in I think I said Section 6.7.2, whatever it was.

Q. Okay. So this hypo- -- not hypothetical. These respondents who thought that the moneys were going to be used for other rivers and lakes, how did you predict that they would vote?

A. Well, we are looking at the effects, not of the one variable you are singling out, but the effects of the suite of variables listed on page G-2, so six variables. So we are looking at changing -- we are looking at the effects of these six changes made together and we predict how the -- we -- from this we developed the predicted probability of voting yes, and those predicted probabilities of voting yes over the sample are what's shown in the column of Table G.1.

Q. Okay. If I'm understanding you correctly, you did not, in the willingness-to-pay number that you calculated in the report, change the vote of a respondent who thought other lakes and

14:10:00 1 rivers would be cleaned up from a yes vote to a no
14:10:03 2 vote in calculating that willingness-to-pay number?
14:10:07 3 A. We changed it statistically so -- we
14:10:13 4 changed it statistically.
14:10:16 5 Q. And how does that statistical change
14:10:20 6 modify the conclusion about estimated willingness to
14:10:26 7 pay?
14:10:28 8 A. Well, let me remind you, you are talking
14:10:31 9 about one of six variables and we didn't change them
14:10:35 10 separately. We felt they were all relevant and we
14:10:39 11 changed them as a suite. In making the change as a
14:10:43 12 suite, it had the effect of raising the lower-bound
14:10:46 13 estimate of mean willingness to pay by -- from $184 to
14:10:52 14 $211.
14:10:54 15 Q. Why did you choose to change them as a
14:11:00 16 suite instead of individually?
14:11:01 17 A. Because we use a series of measures of
14:11:09 18 the scenario and they are different aspects of the
14:11:13 19 survey. We are interested -- I think it makes no
14:11:16 20 sense to look at them individually. Individually they
14:11:22 21 have no meaning. Let me elaborate on this. An
14:11:26 22 individual may think that the funds would be used for
14:11:30 23 other rivers, but an individual may also feel in
14:11:33 24 response to one of the other questions that he would
14:11:37 25 actually have to pay a higher cost than we stated, and

so the individual potentially has impressions about all of the features, multiple features of the program. We have the individual's response to the tradeoff we present through the alum program. We have the individual reflecting on various aspects of what we told him, and it seems to me meaningless to look separately in isolation at different aspects, different facets of the individual's assessment of the information, because at the end of the day, it's one individual, multiple dimensions of the information given and one vote for that individual, and so it makes sense, I think, that's the logical and appropriate thing to do to look at how these various aspects of the individual's assessment of the situation affected his voting and how he would have voted differently if his -- all of these features of the assessment were in line as it were with the survey.

Q. So the hypothetical individual that you referred to, one who thought that he was voting to clean up rivers and lakes in addition to Tenkiller Lake and one who thought he was going to have to pay more than the bid amount, how was his vote adjusted?

A. All of these elements listed in Chapter 6 were taken into account, and we adjusted his vote

overall based on each of these factors and changing each of these factors from what they were to the state here. Now, some of these -- so for any individual there is six factors. For any individual different numbers of factors might have been changed, depending upon the response of that individual to the debriefing questions.

So what we were doing is changing the -- where any of these six factors differed from the status described in this text, we changed that variable to conform to the standards described in this text and then statistically adjusted his vote in the probabilistic sense of recalculating the probability of voting yes or no.

Let me just emphasize with regard to the statistical adjustment, what drives this in the end is the proportions of probabilities of voting yes or no overall. In other words, we have a yes or a no, but the analysis is driven by the percent of yeses or the percent of nos, and so we are making that adjustment to the percent of yeses or nos through the regression equation in Section 6.7.2.

Q. How did you choose the variables that are listed in this scenario acceptance and certainty?

A. I guess we considered the variables. We

were looking for -- we wanted variables that were not multicolinear and we, in discussing among ourselves, felt that this was an appropriate set of variables.

Q. Did you monitor how these respondents' misunderstandings might have affected willingness to pay?

A. I'm not sure what you mean by the word "monitor," so let me say we analyzed how they affected willingness to pay and the analysis is the one I've just described.

Q. In other words, when I say "monitor," did you ask the respondents why they believed their tax dollars would be used to clean up other rivers and lakes in addition to Tenkiller and Illinois River, for example?

A. The questions that we asked are in this -- are in the text of the survey, and we didn't ask questions other than those that appear in this text.

Q. Take a look at page 6.10 of the report, please.

A. Yes. I'm sorry, page?

Q. 6-10.

A. Sorry, yes. Yes.

Q. At the top of that page is Table 6.8. Do

you see that?

A. Yes.

Q. This table says that about 24 percent of the respondents thought the alum program could implemented without the ban. Is that correct?

A. Yes, that's what it says.

Q. So about a quarter of the respondents thought that the alum program could be implemented without the ban and 44 percent of those respondents voted yes; is that right?

A. Yes, that's right.

Q. And if I understand what you did in Section G, you didn't drop those respondents from the survey, right?

A. No. We statistically recoded their response. And let me emphasize, I don't see any reason to drop those respondents from the survey. It's not, in my view, an unreasonable supposition that if there is a method of lessening the injury with a ban, the method might have some efficacy, although a lower one, without the ban, and so it's not -- and the state might decide to go ahead and do that any way. So it's not as though that's some sort of irrational supposition on a respondent's part, in my view.

Q. Taking a look again at page 6-10, this

14:19:39 1 time Table 6.9, if I'm reading it correctly, about
14:19:48 2 45 percent of the respondents thought there would be a
14:19:52 3 different tax amount than that stated by the
14:19:54 4 interviewer; is that right?
14:20:00 5 A. Yes.
14:20:03 6 Q. And about 3 1/2 percent just didn't know
14:20:07 7 or refused to answer the question, right?
14:20:09 8 A. That's correct.
14:20:13 9 Q. Is that a misunderstanding on the part of
14:20:15 10 those respondents?
14:20:16 11 A. No. Again, I think it's not an
14:20:18 12 unreasonable response. One of the things one
14:20:22 13 encounters in Oklahoma and elsewhere is skepticism
14:20:26 14 about the government and skepticism about promises
14:20:31 15 that politicians make. If you notice, of the
14:20:37 16 45 percent who thought the tax would be different than
14:20:41 17 the amount the interviewer told them, essentially sort
14:20:45 18 of two-thirds of that group thought it would be
14:20:46 19 higher, one-third thought it would be lower, and the
14:20:50 20 notion, something that I have encountered in focus
14:21:00 21 groups in this study and other studies is a degree of
14:21:03 22 skepticism that if a politician says, you know, we
14:21:07 23 have this program, health insurance or whatever; it
14:21:11 24 will only cost X dollars, there is a degree of
14:21:13 25 skepticism that the politician is understating the

14:21:15 1 cost and it will cost more.
14:21:16 2 So, again, that's -- respondents bring to
14:21:20 3 a survey, I think, the attitude that they bring in
14:21:26 4 life, you know, to the news, to statements by
14:21:30 5 politicians to everything around them. And if they
14:21:33 6 think politicians lie, you know, when they listen to
14:21:39 7 the news and we come along and we say the State of
14:21:41 8 Oklahoma has a plan to do something, they'll have the
14:21:43 9 same sort of skepticism that they do -- that they do
14:21:48 10 with other things. And what that means is they are
14:21:50 11 making the choice. They are making the tradeoff in a
14:21:54 12 naturalistic and genuine manner, in an authentic
14:22:00 13 manner, so that's exactly why it's not surprising that
14:22:05 14 you get these deviations. And the whole purpose of
14:22:09 15 these debriefing questions is to have a means of
14:22:13 16 adjusting for deviations that will arise naturally.
14:22:18 17 Q. Even though the purpose of the survey is
14:22:22 18 to assess an individual respondent's willingness to
14:22:26 19 pay for the particular commodity, you think it's
14:22:31 20 reasonable that almost 50 percent of the respondents
14:22:35 21 didn't believe that they would have to pay the tax
14:22:37 22 that you told them they had to pay?
14:22:39 23 MS. XIDIS: Objection to form.
14:22:41 24 A. Well, first of all, they didn't believe
14:22:43 25 the amount would be the amount we told them, but I

14:22:48 1 also think you -- I don't agree with what you said
14:22:52 2 earlier in your question, which is the purpose of the
14:23:00 3 survey is not to measure individual -- each
14:23:01 4 individual's or an individual's willingness to pay.
14:23:09 5 Rather, the purpose is to estimate the public's
14:23:13 6 willingness to pay through a sample of the public, but
14:23:20 7 what we get in fact is a probability distribution of
14:23:24 8 willingness to pay for the public.
14:23:26 9 We're not trying to measure Mr. Jones'
14:23:28 10 willingness to pay who lives at 50 Main Street or any
14:23:31 11 of the other individuals. We are trying to measure
14:23:37 12 the public's willingness to pay, but recognizing that
14:23:41 13 there will be variation for many reasons. Different
14:23:45 14 people will see things differently. So we are not
14:23:48 15 interested in a thousand individuals -- individual
14:23:50 16 willingness to pay. We are interested -- we pulled
14:24:00 17 them out, identified them, interviewed them in order
14:24:03 18 to get a sample of the public's willingness to pay.
14:24:07 19 So it's a little like when Gallup
14:24:07 20 interviews a thousand people and says how are you
14:24:11 21 going to vote in the -- you know, in the election next
14:24:13 22 Thursday? They are not interested in those thousand
14:24:15 23 individuals. They are interested in them because they
14:24:18 24 want to come up with an overall probability for the
14:24:20 25 population from which the sample is drawn.

14:24:24 1 Q. (BY MR. DEIHL) I certainly understand
14:24:26 2 the distinction you are drawing, but Gallup is
14:24:28 3 interested in making sure that the people who they
14:24:30 4 talked to accurately report to them what they are
14:24:33 5 going to do next Thursday --
14:24:37 6 MS. XIDIS: Objection to form.
14:24:39 7 Q. (BY MR. DEIHL) -- correct?
14:24:39 8 A. Gallup asks people, How do you plan to
14:24:43 9 vote next Thursday? And what Gallup does is it takes
14:24:48 10 their answers. Gallup actually expends less effort
14:24:52 11 than we did in reminding people of the seriousness of
14:25:01 12 this issue. But Gallup just poses the question to
14:25:03 13 people and Gallup's aim is to record accurately what
14:25:07 14 people say to the interviewer, but Gallup actually has
14:25:13 15 no control and in fact makes no particular effort to
14:25:16 16 warn people to answer accurately. They ask the
14:25:18 17 question, they record the answer.
14:25:22 18 Q. Take a look at page 6-26, please. This
14:25:31 19 is a discussion of your construct validity regression
14:25:35 20 predicting voting in favor; is that right?
14:25:39 21 A. Yes, that's what this page is about.
14:25:43 22 Q. And I direct your attention to the bullet
14:25:46 23 that reads "Tax would be used to clean other
14:25:48 24 rivers/lakes."
14:25:50 25 A. Yes.

14:25:52 1 Q. Could you read that aloud for me.
14:26:00 2 A. So this is "Coded 1 for respondents who
14:26:01 3 thought the tax would be used to clean up other rivers
14:26:05 4 and lakes in Oklahoma in addition to Tenkiller Lake,
14:26:07 5 the Illinois River, and creeks flowing into it and
14:26:09 6 coded 0 for all other respondents. We expect
14:26:13 7 respondents who thought the tax funds would be used to
14:26:15 8 clear up other rivers and lakes would be more inclined
14:26:18 9 to vote for the program."
14:26:33 10 Q. If I understand this correctly, the
14:26:37 11 willingness-to-pay number expressed by these
14:26:41 12 respondents is their value for future water clarity,
14:26:45 13 not just of the Illinois River and Tenkiller Lake, but
14:26:48 14 also for other lakes and rivers in Oklahoma, right?
14:26:50 15 MS. XIDIS: Objection to form.
14:26:52 16 A. Well, let me put it this way: The
14:27:00 17 expectation described here is that they would be more
14:27:03 18 likely to vote for the program if they thought that
14:27:07 19 the program would benefit not just the Illinois River
14:27:11 20 and Tenkiller Lake, but other water bodies.
14:27:15 21 Q. (BY MR. DEIHL) And that's how you coded
14:27:16 22 them?
14:27:20 23 A. That's how we coded the variable, and let
14:27:22 24 me just in this context explain. So the statistical
14:27:24 25 adjustment we made to that is if the person didn't --

14:27:30 1 if that individual didn't think the funds would be
14:27:35 2 used for other rivers, he would be less likely to
14:27:37 3 vote. And so by changing his -- this variable from a
14:27:43 4 1 to a 0, we're going to -- if no other change was
14:27:46 5 made, that would lower the predicted proportion of
14:27:50 6 yeses from whatever the dollar amount was from
14:27:54 7 whatever it was in the actual survey to some lower
14:28:01 8 percent, and that's the example of the adjustment we
14:28:07 9 were making.
14:28:07 10 Q. And similarly, on page 6-25 and 6-26, you
14:28:15 11 made similar adjustments?
14:28:16 12 A. That's correct, yes.
14:28:16 13 Q. And then you did the sensitivity analysis
14:28:26 14 that's reflected in Section -- Appendix G?
14:28:30 15 A. Yes.
14:28:30 16 Q. Okay.
14:28:52 17 THE VIDEOGRAPHER: We have seven minutes
14:28:54 18 of tape left.
14:29:01 19 Q. (BY MR. DEIHL) Let's go back to your
14:29:01 20 article again, Exhibit 7, please.
14:29:07 21 A. Yes.
14:29:07 22 Q. And if you take a look at the top of page
14:29:09 23 25.
14:29:20 24 A. Yes.
14:29:22 25 Q. At the top of that page you wrote, "The

14:29:24 1 mean is extremely sensitive to the right tail of the
14:29:28 2 distribution; that is, to the response of the high
14:29:31 3 bidders. For this reason, if the mean is to be used,
14:29:35 4 a nonparametric or bounded influence approach is
14:29:39 5 highly recommended for fitting the willingness-to-pay
14:29:41 6 distribution." What does -- can you explain to me
14:29:48 7 what that means?
14:29:50 8 A. I take it as a backhanded compliment to
14:29:54 9 the transparency and lucidity of my prose, but if I
14:30:09 10 take the sort of second sentence, what it in effect is
14:30:15 11 recommending in practice is the low-bound estimate of
14:30:18 12 the mean willingness to pay, which is the estimate
14:30:20 13 that we used here.
14:30:26 14 Q. Okay. Why did you multiply your
14:30:33 15 estimated willingness-to-pay number by the total
14:30:37 16 number of households in the surveyed counties?
14:30:43 17 A. Because it was the right thing to do and
14:30:45 18 the logical thing to do. We have a sample -- a random
14:30:50 19 sample that reflects those households. Let me just
14:31:00 20 take one minute and go to the right section of the
14:31:03 21 report. The sample of a thousand or however many
14:31:09 22 households that we surveyed is a probability sample
14:31:15 23 that reflects the 1.3 million households in the
14:31:20 24 portion of Oklahoma we are talking about. And we have
14:31:22 25 an estimate of the average willingness to pay per

household for those 1.3 million households, and so it's mathematically appropriate and correct to -- if you want an estimate of the total overall 1.3 million households to multiply the average by the number of households, and so that's what we were doing in this Section 7.2.

MR. DEIHL: I think we need to change the tape. Why don't we take a break for a tape change, please.

THE VIDEOGRAPHER: Going off the record. The time is 2:32. This marks the end of Tape 2.

(Recess taken, 2:32 p.m. to 2:45 p.m.)

THE VIDEOGRAPHER: This marks the start of Tape 3 of the videotaped deposition of Michael Hanemann. Back on the record. The time is 2:45.

Q. (BY MR. DEIHL) Dr. Hanemann, how did you arrive at the number of households that you multiplied by the willingness-to-pay estimator?

A. That number was obtained by. Dr. Tourangeau, and so he is the one who can explain it. Obviously there is some text here, but I don't have any -- I myself don't have any independent knowledge beyond what it says in the text.

Q. Why did you choose to multiply the willingness-to-pay number times the number of

households in the study area?

A. Well, it seems appropriate and consistent with conventional practice. We're sampling households, we have an estimate of value per household and therefore one would apply to the number of households.

Q. How did you select the study area?

A. The study area was -- is Oklahoma apart from the small number of western counties, which account for 3.4 percent of the households. If you are asking me -- are you asking me why those counties were not included?

Q. I would like to know why those counties were not included.

A. I think that's described here, so let me just see if -- so this is mentioned on page 5-2 in Section 5.2.1. And that starts off by saying that, "The target population for the study was the civilian adult household population of Oklahoma," and it goes on to define what that means. Then if you turn the page -- so at that point it would be the -- it would be the civilian adult household population in Oklahoma, i.e., in all of the counties in Oklahoma. Then on page 5-3 it goes on to explain that, "To reduce data collection costs, some counties in the

14:48:54 1 western portion of the state were dropped prior to
14:49:01 2 sampling," and that was done just to make the budget
14:49:07 3 go further; that is, by reducing expenditure on those
14:49:15 4 counties.
14:49:15 5 Those counties have two unfortunate
14:49:16 6 features, unfortunate from our perspective because
14:49:20 7 they are very rural. The cost of the survey per
14:49:26 8 household would be unusually high, and also those
14:49:31 9 households have a low population. And so although
14:49:35 10 it's 14 counties, it's whatever I said, 3.4 percent of
14:49:41 11 the households, so that was just a pragmatic
14:49:45 12 adjustment. It leaves our estimate to be low because
14:49:48 13 some of those households may have a value, but it was
14:49:54 14 a pragmatic adjustment.
14:50:00 15 Q. Why was your target population only adult
14:50:03 16 household population of Oklahoma?
14:50:30 17 A. My impression as an individual economist
14:50:37 18 is that this is largely a legal matter and not an
14:50:41 19 economic matter; that is, what is the set of -- what
14:50:48 20 is the population that counts in this context I think
14:50:54 21 is a legal matter, but since I'm not a lawyer and you
14:51:03 22 all are, you'll know that better than I do. What it
14:51:07 23 comes down to is that we are looking at the damages to
14:51:16 24 the people of Oklahoma, and essentially we took that
14:51:22 25 as the starting point, and so that's the -- and I

don't know if there was -- it certainly is logical, moreover it's common in studies, both natural resource damage assessment studies, but other studies. So, for example, in Mono Lake, we just looked at the value to households in California. And as I said, that's common in many valuation exercises, not just in damage assessments.

So I wasn't surprised that we took that as the framing for our analysis. And as I say, I don't know if there are legal reasons behind that or not. I have no knowledge, but this certainly would be a common practice to restrict the values being estimated to the population of that state.

Q. You would agree with me, would you not, that, for example, in your Mono Lake study, someone like me in Colorado could have a nonuse value for Mono Lake?

A. Yes, I would agree.

Q. And is there a scientific reason why researchers like yourself would exclude me from a survey measuring nonuse value at Mono Lake?

A. As I see it, there are two sets of factors. One factor is this: As I mentioned before, we are not -- we, the research team, are not the decision makers either here or, for example, in Mono

Lake. It was the State Water Resources Control Board, which was making a balancing -- making a balancing among beneficial uses. And so at the end of the day, it's determined by the party that's the decision maker, the state water board in California and the court in Oklahoma. And we would defer to whatever direction came from that source, absolutely.

A secondary consideration -- what I've just mentioned is the primary one. A secondary consideration is the more difficult logistics, the greater difficulty from a practical point of view in doing the survey for an out-of-state population. Not that it can't be done, but, as I say, there is greater difficulty. So those are the two factors that typically come into play in my experience.

Q. In connection with this survey, you didn't include users from states other than Oklahoma?

A. We didn't include people, users or nonusers, from outside the state.

Q. And, again, that was due to these two factors that you've already identified?

A. Yes.

Q. Had you included users from outside of Oklahoma, would that have potentially affected the results of the survey?

14:54:45 1 MS. XIDIS: Objection to form.
14:54:46 2 A. Yes. Had we included users or nonusers
14:54:50 3 from out of state, it would probably have affected our
14:55:01 4 conclusion. It would probably have raised the
14:55:05 5 assessed value of the injuries.
14:55:13 6 Q. (BY MR. DEIHL) In the situation of a
14:55:15 7 good -- let's use another hypothetical like Mono Lake
14:55:18 8 where a number of people probably from throughout the
14:55:24 9 United States have heard of Mono Lake. Were you to do
14:55:28 10 a survey of the entire population of the United States
14:55:33 11 to determine a tax amount to clean up Mono Lake, in
14:55:39 12 your opinion, would that be a valid contingent
14:55:41 13 valuation survey to measure the price that citizens in
14:55:48 14 the United States would be willing to pay to save Mono
14:55:52 15 Lake?
14:55:54 16 MS. XIDIS: Objection to form.
14:55:54 17 A. Well, with any study what matters is the
14:56:01 18 details of how it's done. But accepting that, I would
14:56:05 19 say yes, and I'll give you an example. I was
14:56:09 20 involved -- served on the National Academy of Sciences
14:56:13 21 Committee looking at the Colorado River and Glen
14:56:15 22 Canyon. The operation of Glen Canyon Dam adversely
14:56:18 23 affected the Colorado River, the ecosystem in the
14:56:24 24 Grand Canyon National Park. The committee of which I
14:56:26 25 was a member recommended that the Bureau of

14:56:30 1 Reclamation do not a national, but a multi-state
14:56:37 2 survey to measure nonuse values for the Colorado
14:56:41 3 River, and I'm just mentioning that and that was done.
14:56:46 4 So I'm mentioning that as an example.
14:56:50 5 Again, apart from the two considerations
14:56:50 6 I've mentioned, there is also, if you would like a
14:57:00 7 third practical consideration, the survey costs rise.
14:57:05 8 And so whether this is justified on a pragmatic ground
14:57:13 9 also depends in addition to sort of issues of, you
14:57:15 10 know, sort of the legal issues on whether the extra
14:57:20 11 survey costs, you know, are worth it for a
14:57:24 12 particular -- for the particular resource in question.
14:57:37 13 Q. (BY MR. DEIHL) We talked a little bit
14:57:37 14 earlier about the estimator that you used in this
14:57:41 15 case, and I think you referred to it as the ABERS
14:57:45 16 estimator. Can you point me to any contingent
14:57:46 17 valuation literature that uses the ABERS estimator?
14:58:00 18 A. Yes. There's -- let me just -- well,
14:58:13 19 actually, I don't have references in the report, but
14:58:22 20 it became a known to CV researchers as a result of a
14:58:31 21 paper by a Swedish economist, who had worked as
14:58:33 22 post-doc with me and is well known in environmental
14:58:37 23 resource economics, and his last name is Kristron,
14:58:39 24 K-r-i-s-t-r-o-n, and he wrote a paper, and I'm going
14:59:00 25 to say around 1990, but I am -- and this is sort of

14:59:03 1 plus or minus five or six years -- pointing it out --
14:59:09 2 citing that estimator. And that's how I became aware
14:59:16 3 of it, and it's been used widely since then, so let me
14:59:24 4 just qualify that.
14:59:26 5 There are -- you can classify the
14:59:30 6 statistical analyses of the responses to a CV survey
14:59:33 7 like this into two groups; parametric and
14:59:35 8 nonparametric, and those are terms of art. And what
14:59:41 9 they mean is parametric is where you fit -- let me
14:59:46 10 just back up. The responses give you points on a
14:59:50 11 probability distribution of willingness to pay and the
14:59:54 12 statistical analysis has to do with fitting that
15:00:03 13 distribution. The parametric analyses assume a
15:00:07 14 particular form of probability distribution, and
15:00:11 15 logit, for example, refers -- which is a term commonly
15:00:15 16 applied -- refers to what's called a logistic
15:00:18 17 probability distribution.
15:00:22 18 Nonparametric is where you don't make any
15:00:30 19 assumption about the probability distribution. It's
15:00:33 20 on the one hand, if you like, very ascetic,
15:00:35 21 a-s-c-e-t-i-c, ascetic in that sense; that is, you
15:00:37 22 restrict yourself and you make minimal assumptions,
15:00:46 23 and therefore you get a minimalist representation of
15:00:50 24 the probability distribution, because you want to make
15:01:00 25 minimal assumptions.

If you use a parametric analysis, whatever form, that automatically imposes monotonicity, so you just fit the parametric model and monotonicity is satisfied.

If you do a nonparametric analysis and practice monotonicity is not satisfied -- and this is true not just in contingent valuation, but in dose-response experiments and all areas where the data has this mathematical form regardless of the context. And this issue was first recognized in 1955, and that's the paper by several authors whose acronym is ABERS. And it was Kristron's paper which talked about the relevance of this phenom parametric estimate of CV responses, but also in effect advocated or encouraged nonparametric estimation of CV responses. And since then every study that I have seen that chooses to use a nonparametric analysis will use the ABERS estimator.

Q. How many studies have you seen that chose to use a nonparametric analysis?

A. You know, I can't answer that sitting here. There is a huge literature now, and I looked at this and talked about it when I -- on two occasions. I wrote a very well-known book chapter with Barbara Kanninen on the statistical analysis of CV data, which -- let me just give you the item number from my

15:03:18 1 dissertation, and it would help if I could -- it's
15:03:28 2 just -- it's item C-26 on page 14 of my resume, The
15:03:33 3 Statistical Analysis of Discrete-Response in a book on
15:03:39 4 valuing environment preferences. And then more
15:03:43 5 recently I wrote the chapter with -- coauthored the
15:03:46 6 chapter with Richard Carson, the chapter on the
15:03:46 7 contingent valuation in the, whatever it is, the
15:03:52 8 second or third volume of The Handbook of
15:03:54 9 Environmental Economics, which is the sort of
15:04:00 10 definitive set of handbooks on environmental
15:04:03 11 economics. And in both of those cases, I will have
15:04:07 12 given citations to papers which do it -- which use
15:04:09 13 that estimator, but I can't give you a more precise
15:04:13 14 answer as I sit here now.
15:04:15 15 Q. Did you use the ABERS estimator in
15:04:18 16 connection with the Montrose study?
15:04:22 17 A. Yes.
15:05:20 18 Q. One of your coauthors testified that the
15:05:24 19 ABERS estimator and the Turnbull estimator are the
15:05:28 20 same. Would you agree with that?
15:05:33 21 A. I would agree with that. Maybe I can
15:05:35 22 just elaborate. The context is nonparametric
15:05:52 23 estimation of a willingness-to-pay distribution.
15:06:03 24 Ayers and Turnbull -- we are talking about two
15:06:09 25 different types of data. Ayers assumed you had in

15:06:16 1 effect a single yes or no; that is, at each bid
15:06:20 2 amounts or at each dose amount, you had a single yes
15:06:24 3 or no or a single survive or die or whatever,
15:06:26 4 depending upon the experiment.
15:06:30 5 Turnbull analyzed -- and Ayers, et al.,
15:06:30 6 the ABERS authors, showed how to estimate it
15:06:37 7 nonparametrically and imposing monotonicity. Turnbull
15:06:43 8 assumed you had slightly more different data, slightly
15:06:48 9 different and slightly more complex. And, again, the
15:06:52 10 technical term is interval data, and the way to sort
15:07:01 11 of represent that or summarize that is instead of
15:07:05 12 having, let's say, just a lower bound or just an upper
15:07:09 13 bound, you have two bounds. That is, instead of
15:07:11 14 knowing that a patient -- the life of a patient who
15:07:15 15 had been treated with a certain treatment was greater
15:07:18 16 than 15 years or less than 15 years, you knew that it
15:07:22 17 was greater than 15 years, but less than 20 years,
15:07:24 18 let's say.
15:07:26 19 And so Turnbull set out to answer the
15:07:30 20 question: Suppose you want a nonparametric estimator,
15:07:31 21 which satisfies monotonicity with this other type of
15:07:37 22 data where you have two bounds, how would you do it?
15:07:39 23 And what he proved is you have to do certain
15:07:45 24 additional manipulations, which I won't describe, but
15:07:46 25 then the Ayers procedure, the ABERS procedure applies,

15:07:50 1 so that's the sense in which there is some extra stuff
15:08:00 2 going on, but Turnbull also then uses the ABERS
15:08:03 3 procedure for the same reason that ABERS did; that is,
15:08:05 4 that's how to impose monotonicity in a nonparametric
15:08:09 5 data, so that's what's meant by saying that they're
15:08:15 6 the same, as it were. Turnbull ends up traveling
15:08:22 7 along the same path as ABERS had set out.
15:08:30 8 Q. If you could go back to Deposition
15:08:31 9 Exhibit No. 7, which is your article.
15:08:33 10 A. Sure. Yes.
15:08:39 11 Q. At the bottom of page 22, you say, "The
15:08:54 12 goal in designing a contingent valuation survey is to
15:09:01 13 formulate it around a specific commodity that captures
15:09:05 14 what one seeks to value, yet is plausible and
15:09:07 15 meaningful. The scenario for providing the commodity
15:09:11 16 may be real; if not, the key is to make it seem real
15:09:15 17 to respondents. They are not actually making a
15:09:18 18 payment during the interview, but they are expressing
15:09:20 19 their intention to pay." Did I read that correctly?
15:09:26 20 A. Yes.
15:09:28 21 Q. Is it important that the respondents
15:09:28 22 believe that they will pay the willingness to pay?
15:09:33 23 MS. XIDIS: Objection to form.
15:09:37 24 A. Well, this is discussed in the -- under
15:09:41 25 the rubric of consequentiality; that is, it's

important that respondents believe that their survey response will have a consequence. For example, will influence the government to go ahead with the program that will then compel them to make a payment.

Q. (BY MR. DEIHL) So it is important that they believe there is a consequence to their decision?

A. Yes.

Q. And in this particular survey, the consequence was that the State of Oklahoma would go forward with a program that would result in a tax on them?

A. Yes.

Q. And they believed that they would have to pay that tax?

A. Well, we asked them if they believed they would have to pay the amount we said and so on, and some 13 percent or whatever thought they would have to pay a lower amount, but, yes.

Q. For those particular individuals who told you that they didn't pay Oklahoma state income tax, did the survey have the amount of consequentiality that you would want?

A. Those -- I guess the short answer is yes; that is, believing that you won't pay tax is one reason why you might believe that the amount you would

15:11:20 1 have to pay is less than $80 or whatever we said.
15:11:24 2 It's not the only reason why you might believe that
15:11:28 3 the amount you would have to pay is less than $80;
15:11:30 4 that is, taxpayers' cost. So at the end of the day,
15:11:33 5 the key measure of consequentiality is whether you
15:11:39 6 believed you would have to pay the amount we said or
15:11:41 7 more, and 13 percent or something like that thought
15:11:46 8 they wouldn't have to pay the amount we said or more,
15:11:48 9 but that's one of the adjustments we made and the
15:11:52 10 overall set of adjustment was to raise the dollar
15:12:01 11 amount.
15:12:01 12 Q. A higher percent than 13 don't pay any
15:12:05 13 income tax to the State of Oklahoma, correct?
15:12:07 14 A. At present, yes.
15:12:09 15 Q. So why do you think that those percent of
15:12:15 16 respondents actually believed that they would pay the
15:12:20 17 bid amount?
15:12:20 18 MS. XIDIS: Objection to form.
15:12:22 19 A. Well, we asked the question. This is a
15:12:28 20 survey, it's done in a sort of thoughtful manner.
15:12:30 21 It's a serious manner. We come to their home. And I
15:12:37 22 don't know why respondents answered the way they did
15:12:43 23 in general except where there were specific questions
15:12:46 24 to that. Am I surprised? Not necessarily, because --
15:12:50 25 for at least two reasons. But these reasons are

15:13:01 1 speculation, so I don't want to put too much weight on
15:13:03 2 them. One is you don't pay taxes this year, but you
15:13:07 3 don't know what your income will wind up being next
15:13:09 4 year or for that matter what the tax rules will wind
15:13:13 5 up being. I mean, in a sense you find out your taxes
15:13:15 6 ex post on April 15, you know, not during the calendar
15:13:20 7 year.
15:13:22 8 But the second thing is this is a
15:13:26 9 program, as we described, that the State of Oklahoma
15:13:30 10 will do and will finance through taxation, and this
15:13:33 11 may have seemed plausible to them that they will be
15:13:35 12 taxed even though they are not currently or weren't in
15:13:39 13 the past taxpayers.
15:14:22 14 Q. Dr. Hanemann, do you have a copy of the
15:14:26 15 Montrose exhibit in front of you? I believe it's
15:14:43 16 Exhibit No. 2.
15:14:46 17 A. I have it.
15:15:03 18 Q. Take a look at Section 9, please, of the
15:15:09 19 index. Do you have that in front of you?
15:15:16 20 A. Yes.
15:15:16 21 Q. Section 9.4 reads "Univariate (Turnbull)
15:15:18 22 Estimation of Lower-Bound Mean Willingness To Pay."
15:15:24 23 A. Yes.
15:15:24 24 Q. Does that refresh your recollection of
15:15:28 25 what kind of estimator was used in the Montrose

survey?

A. Actually, no. I'm not quite sure what was done.

Q. Is that different from an ABERS estimator?

A. You know, I don't know what exactly was done. It would help if I saw the text. As I have -- so I have explained to you the relationship between Turnbull and Ayers, and it hinges on whether you have single bound or a double bound. And what I've also pointed out is that the key feature of monotonicity is handled in exactly the same way in both of them.

Q. And you said -- you've explained to me the similarities between Turnbull and what?

A. And the ABERS.

Q. ABERS, okay. Thank you.

(Deposition Exhibit 8 was marked.)

Q. Dr. Hanemann, I've handed you what's been marked for purposes of identification as Deposition Exhibit No. 8 --

A. Yes.

Q. -- which is an article entitled "'Scenario Adjustment' in Stated Preference Research." Do you have that in front of you?

A. Yes. I mean, it looks as though as it's

15:17:33 1 working paper. It hasn't been accepted for
15:17:37 2 publication.
15:17:37 3 Q. This document was contained in your
15:17:39 4 considered-by materials and was dated May 7, 2007.
15:17:46 5 A. Uh-huh.
15:17:46 6 Q. Trudy Cameron is the author of this
15:17:52 7 document; is that correct?
15:17:52 8 A. Her name is listed here.
15:18:00 9 Q. Do you know Dr. Cameron?
15:18:01 10 A. Yes.
15:18:03 11 Q. Is she considered to be a well-respected
15:18:05 12 natural resource economist?
15:18:07 13 A. Yes.
15:18:11 14 Q. What specific aspect of your contingent
15:18:13 15 valuation study did you think this article could
15:18:16 16 inform?
15:18:16 17 A. Oh, I don't know. Let me say the term
15:18:22 18 "considered-by list," "considered by" is actually a
15:18:26 19 misnomer. I handed -- I mean, I copied files, which I
15:18:31 20 had downloaded or assembled at one point in time or
15:18:35 21 another that I might want to consider, but for many of
15:18:41 22 them, if not for most, I didn't actually consider
15:18:43 23 them, and so I don't recall what this paper does. As
15:18:50 24 I said, there was no -- I haven't considered it.
15:19:05 25 Q. Take a look at the Abstract on page 1 of

this article. Towards the bottom of the abstract is a definition of scenario adjustment. Do you see that?

A. Let me read this. You know, I would need to look at the paper some more. I'm not sure what it's about, and let me explain. It may be about conjoint analysis, I'm not sure, and if it is, that's certainly a somewhat different technique from what we did. But anyhow, I don't know what this -- I mean, I see the phrase "scenario adjustment," but I don't know what the context for the study is.

Q. Why don't you take a moment and look through this and see if you can refresh your recollection why this was in your considered-by documents.

A. I have -- I'm not going to be able -- I have no idea why it was in there. As I came across some papers that struck me as possibly useful, I would put them -- I put them in that folder, and in many cases I didn't go back to them or use them, so that is just kind of a holding pen.

Q. So at some point in time this struck you as possibly useful?

A. It struck me as possibly relevant for something, but not necessarily scenario adjustment. I don't know -- so offhand I don't know what the

15:21:07 1 motivation was.
15:21:09 2 Q. Did you test for scenario adjustment in
15:21:11 3 this contingent valuation survey?
15:21:13 4 A. You know, I don't know what the phrase
15:21:16 5 means to test for scenario adjustment. I don't know
15:21:20 6 if that phrase is used by Cameron or not. I
15:21:24 7 understand the phrase "performance scenario
15:21:28 8 adjustment" and that's what we did and what we talked
15:21:30 9 about before the break, but I don't know what it would
15:21:31 10 mean to test for a scenario adjustment.
15:21:37 11 Q. Did you implement Dr. Cameron's
15:21:39 12 recommendations of ways to control for and correct for
15:21:43 13 scenario adjustment?
15:21:45 14 A. Sitting here now, I have no idea what her
15:21:46 15 recommendation is. I don't know if it would apply to
15:21:50 16 our type of data, and so I don't know -- I've told you
15:21:52 17 what we did, and I don't know how that relates to what
15:22:01 18 she discusses here.
15:22:03 19 (Deposition Exhibit 9 was marked.)
15:22:35 20 Q. Dr. Hanemann, I've handed you what's been
15:22:37 21 marked as Deposition Exhibit No. 9.
15:22:39 22 A. Yes.
15:22:41 23 Q. Can you identify this document, please.
15:22:43 24 A. It's a document entitled -- it's a
15:22:43 25 PowerPoint entitled "Embedding in Stated Preference,"

15:22:46 1 and I'm the author.
15:23:05 2 Q. Take a look at page 7 of this PowerPoint,
15:23:07 3 please.
15:23:16 4 A. That's labeled "Explaining Scope
15:23:18 5 Effects"?
15:23:20 6 Q. That's correct.
15:23:20 7 A. Yes.
15:23:22 8 Q. The purpose of this page is to provide
15:23:26 9 reasons why a scope test might fail; isn't that right?
15:23:30 10 A. It lists reasons why people may value a
15:23:31 11 large and a small item the same.
15:23:37 12 Q. How did you go about ensuring that the
15:23:41 13 base and scope commodities in the CV survey conducted
15:23:45 14 for this litigation were meaningfully different to the
15:23:46 15 respondents?
15:23:50 16 MS. XIDIS: Objection to form.
15:23:52 17 A. Your question may be compounding two
15:24:00 18 different things. One is were the injuries being
15:24:05 19 valued; that is, the reduction in injuries being
15:24:07 20 valued, were those different? So were there two
15:24:11 21 different reductions in injuries? And then a separate
15:24:13 22 question is did people value those two things
15:24:16 23 differently? The data showed ambiguously that people
15:24:20 24 valued those two scenarios differently.
15:24:26 25 As to the question, Are they different,

15:24:31 1 that's both a matter of logic and economics that they
15:24:33 2 were different and that what we call the scope
15:24:37 3 experiment was a smaller item than the base
15:24:39 4 experiment.
15:24:41 5 Q. (BY MR. DEIHL) Where in your report do
15:24:48 6 you document the rigor and scientific process used to
15:25:00 7 develop the scope commodity for this survey?
15:25:05 8 A. Could you repeat that question?
15:25:07 9 Q. Where in your report do you document the
15:25:11 10 purported rigor and scientific process used to develop
15:25:13 11 the scope commodity for this CV survey?
15:25:18 12 MS. XIDIS: Objection to form.
15:25:18 13 A. So you are bundling two different things:
15:25:20 14 Rigor and scientific process. There is supposed to be
15:25:26 15 rigor, and the rigor with which we developed the scope
15:25:31 16 instrument is essentially similar to the rigor with
15:25:35 17 which we developed the main instrument with an
15:25:39 18 exception, which I'll come to in a moment; that is,
15:25:43 19 through a process of testing, refinement through
15:25:45 20 focus groups and so on which I have described in some
15:25:48 21 chapter of this report.
15:25:52 22 With regard to the scientific process,
15:26:00 23 there is not supposed to be one; that is -- and let me
15:26:05 24 explain. The logic of a scope experiment is to answer
15:26:09 25 a simple question, which is, Is willingness to pay

15:26:15 1 sensitive to the magnitude of the commodity being
15:26:16 2 valued? And what the NOAA panel recommended is one
15:26:22 3 vary the magnitude of the commodity that's the object
15:26:28 4 of estimation and conduct a survey -- conduct a
15:26:31 5 valuation exercise and see if the value is different.
15:26:35 6 For this purpose all that matters is that the -- this
15:26:39 7 item being tested in the scope experiment be -- have a
15:26:41 8 different magnitude, whether it's larger or smaller.
15:26:43 9 What's not important is that it be scientifically
15:26:48 10 accurate, and the logic in the main survey in this
15:26:52 11 context is measuring some injuries. This is a
15:27:00 12 peripheral question, which is if the injuries were
15:27:05 13 different, would the valuation would be different, but
15:27:07 14 these different injuries are not believed to be real
15:27:09 15 injuries occurring someplace. They are just straw man
15:27:13 16 injuries. That's the logic of these and it's
15:27:15 17 important that they be different.
15:27:16 18 And I have to say the context for this,
15:27:18 19 what drew this up, was a study coauthored by
15:27:22 20 Dr. Desvousges, which was, in my view, a completely
15:27:28 21 bogus demonstration purporting to show that 100-fold
15:27:35 22 difference in injuries produced no difference in the
15:27:39 23 valuation. That was tremendously influential at the
15:27:41 24 time and I believe is what prompted the NOAA panel to
15:27:48 25 make this request. As I've said, I believe it's a

15:27:52 1 bogus demonstration.
15:27:52 2 But anyhow regardless of what
15:28:00 3 Dr. Desvousges did and the NOAA panel requested, the
15:28:03 4 salient point is that the scope experiment is a
15:28:09 5 peripheral injury which is required to be different,
15:28:13 6 and in that sense it doesn't merit sort of scientific
15:28:16 7 rigor. Its only salient attribute is it's different
15:28:22 8 from the injury.
15:28:24 9 Let me just -- since we are on this, let
15:28:41 10 me mention one thing on that page that you referred
15:28:43 11 to. This explains why -- as you pointed out
15:28:48 12 correctly, some reasons why you might not get a scope
15:28:50 13 effect. And the second reason -- I mean, the first
15:28:54 14 reason is contingent valuation fails to measure
15:29:01 15 economic value, which was Dr. Desvousges' contention
15:29:05 16 at the time. The second reason is that people don't
15:29:07 17 see the two commodities, the two injuries as
15:29:11 18 different.
15:29:13 19 And in fact, although he never disclosed
15:29:15 20 this, Dr. Desvousges' data show demonstrably that the
15:29:20 21 different scenarios, the three different scenarios
15:29:22 22 that he was testing were not considered to be
15:29:26 23 different by the three groups of people, and so it's
15:29:30 24 actually a beautiful illustration of reason (b) on
15:29:33 25 this slide.

15:29:37 1 Q. The -- if I understand you, the purpose
15:29:41 2 of the scope test is to see if those who are given the
15:29:50 3 scope test value that injury differently from the base
15:30:01 4 injury?
15:30:01 5 A. Yes.
15:30:03 6 Q. And so it's important that the two
15:30:05 7 injuries in the scope and the base survey be
15:30:09 8 different, I would assume?
15:30:09 9 A. Yes. Be seen as different and that, of
15:30:11 10 course, is the -- so it's important that they be
15:30:16 11 perceived as different. This is what psychologists
15:30:16 12 call a manipulation check, because if they are not
15:30:20 13 seen as different, you wouldn't expect different
15:30:22 14 values, and this is kind of a failed and pointless
15:30:26 15 experiment.
15:30:28 16 Q. How do you design or how did you design
15:30:31 17 in this survey the injury and the scope to be
15:30:35 18 different?
15:31:35 19 A. We made basically two changes.
15:31:39 20 Q. Tell me what you are referring to.
15:31:41 21 A. Oh, I'm looking at -- excuse me. I'm
15:31:45 22 looking at the questionnaire in the base survey, which
15:31:46 23 is pages A-2 to whatever, A-50. For example, I was
15:31:52 24 looking at the show card on page A-46. The scope
15:32:03 25 questionnaire starts on page A-51 and runs to page

15:32:07 1 A-98, and I was looking at the show card on page 94.
15:32:20 2 But putting those cards aside, let me see if I can
15:32:26 3 summarize it. In the scope, the river would heal
15:32:31 4 naturally and the lake could be fixed. I mean, could
15:32:39 5 be -- the recovery could be accelerated by 10 years,
15:32:45 6 and the main -- the recovery of the lake could be
15:32:48 7 accelerated by 40 years, not 10 years, and the
15:32:52 8 recovery of the river could be accelerated also. So
15:33:01 9 those are the two differences between the main and the
15:33:05 10 scope.
15:33:15 11 Q. Take a look, again, at Deposition Exhibit
15:33:18 12 No. 9, which is your PowerPoint.
15:33:24 13 A. Yes.
15:33:28 14 Q. And go to the following page, which is
15:33:30 15 page 8.
15:33:39 16 A. That's this page?
15:33:41 17 Q. Yes. It's the page that states at the
15:33:43 18 top "Need to incorporate manipulation checks in survey
15:33:46 19 to test which explanations apply."
15:33:50 20 A. Yes.
15:33:54 21 Q. Are these manipulation checks across
15:34:00 22 subjects or within subjects?
15:34:03 23 A. Well, it depends to whom the -- it
15:34:07 24 depends how the scope test is being administered. So
15:34:13 25 if the scope test is what's called an external test,

so different subjects get different injuries, then these things would apply to each of the separate samples.

Q. Do you do these manipulation checks during pretesting?

A. Questions -- well, the manipulation -- the manipulation checks that we employed in this study are for the most part somewhat slightly different from this, but given that, we did manipulation checks; that is, we asked questions. We ourselves assessed the responses in the focus groups where we were testing the scope.

Q. Okay. Did you also do manipulation tests in the final administration of the base survey?

A. Yes. Let me just correct one thing. The first item on that page is a nonmonetary assessment of the item, and what I mean by that is an expression -- an assessment of how big a deal the injury is or the program that eliminates the injury, and I'm using the phrase "how big a deal" sort of colloquially, and that's exactly what we picked up on in respondents' comments in focus groups which faced the scope scenario and focus groups which faced the main one.

And also in the discussion in those focus groups, the third item here was; that is, people

15:36:16 1 discussed what I'm listing in the third item, and our
15:36:18 2 assessment of that was the manipulation check.
15:36:24 3 The other two items are not relevant in a
15:36:28 4 context, but are relevant to a number of studies in
15:36:33 5 the literature, which purported to find no scope test
15:36:37 6 because they didn't control for those things.
15:36:41 7 Now, your question was do we have
15:36:46 8 something like a manipulation test in this survey?
15:36:50 9 And I believe we do. Let me just go back. I can do
15:37:01 10 it with either questionnaire. If you don't mind, let
15:37:28 11 me refresh my memory and just look at what we say in
15:37:33 12 the report about the scope test.
15:38:24 13 An example in the spirit of this is the
15:38:26 14 difference in reasons for voting against the program
15:38:30 15 between the main program and the scope. The reasons
15:38:35 16 for voting against the program from the main are given
15:38:37 17 on page 6-5 in Table 6.3, and the reasons -- so that's
15:38:45 18 page 6-5. And the reasons in the scope are on page
15:39:03 19 6-32, which is Table 6.28. The single most common
15:39:09 20 reason with the scope is that the program does not do
15:39:13 21 enough, and maybe the analog for the main program only
15:39:20 22 helps a few rivers and lakes. It gets only 6 percent
15:39:26 23 of the responses, so this -- that difference would be
15:39:31 24 an example of a manipulation check between the two
15:39:37 25 surveys.

15:39:41 1 Q. Okay. Any other examples of manipulation
15:39:45 2 checks between the two surveys?
15:39:48 3 A. Let me check. Well, an example of
15:40:24 4 something like that would also be questions 25 and 26
15:40:30 5 in both cases, so if you look, for example, at 26, if
15:40:35 6 you look at page A-22 and A-71.
15:41:15 7 Q. Okay. That's an example of a
15:41:15 8 manipulation check in your opinion?
15:41:16 9 A. You would expect a difference in the
15:41:20 10 responses to those questions between the two pages.
15:41:22 11 Q. And did you receive a difference in the
15:41:24 12 responses?
15:41:26 13 A. I no longer -- I don't recall. Sitting
15:41:30 14 offhand, I don't recall what the tabulations were, and
15:41:35 15 that would be in the data.
15:41:41 16 Q. Take a look back to your article, please.
15:41:43 17 A. Yes.
15:41:45 18 Q. Or our PowerPoint, I'm sorry.
15:41:46 19 A. Yes.
15:41:46 20 Q. The following page which at the top is
15:41:48 21 "Examples of Manipulation Check"?
15:41:52 22 A. Yes.
15:41:52 23 Q. This is referring to an upcoming article
15:41:54 24 by Dr. Bishop?
15:42:00 25 A. It has since been published, yes.

15:42:01 1 Q. Okay. And he refers to some different
15:42:07 2 kinds of manipulation checks, right? An affective
15:42:11 3 scope, a cognitive scope, an economic scope. Do you
15:42:15 4 see that?
15:42:15 5 A. Right.
15:42:15 6 Q. Did you implement all of these difference
15:42:16 7 checks?
15:42:18 8 A. No, and I don't think -- let me explain
15:42:24 9 the context. The paper by Herbelein, et al., offers
15:42:26 10 an explanation why certain studies failed to find the
15:42:35 11 scope affect, and it suggests that an explanation
15:42:41 12 could be that there was no affective difference
15:42:45 13 between the two items whose values were being
15:42:46 14 compared. No difference in the sense of affect or no
15:42:52 15 difference in the sort of cognitive sense and they
15:42:54 16 define that. We found a difference, an ambiguous
15:43:03 17 difference in willingness to pay, and I mention some
15:43:07 18 of these other things also show a difference, and
15:43:11 19 so -- but also we had limited space in the survey, and
15:43:20 20 so I don't think there was any reason in this context
15:43:28 21 to add the questions referred to on this page, the two
15:43:33 22 sets of questions.
15:43:48 23 Q. When you compare the mean willingness to
15:43:50 24 pay for the base and scope versions of the survey, the
15:44:00 25 willingness to pay for the commodity and the scope

15:44:03 1 version is approximately 75 percent of the willingness
15:44:07 2 to pay for the base commodity; is that correct?
15:44:15 3 A. Let me just go look at this. Do you
15:44:33 4 recall the dollar amount for the scope? I know it
15:44:35 5 appears somewhere in this report, but . . .
15:44:39 6 Q. I don't recall it.
15:44:43 7 A. Okay. I'll accept the statement you say.
15:44:50 8 So what is your question?
15:45:03 9 Q. If I'm right that the willingness to pay
15:45:07 10 for the scope version is 75 percent, the willingness
15:45:13 11 to pay for the base version, that means that a faster
15:45:15 12 cleanup of the river is worth less than $46 despite it
15:45:22 13 being bigger in size?
15:45:24 14 A. No, it doesn't mean that.
15:45:24 15 MS. XIDIS: Objection to form.
15:45:25 16 Q. (BY MR. DEIHL) Why not?
15:45:26 17 A. Well, it's an elementary error. So the
15:45:30 18 value of, I'll say injury A plus injury B, just as a
15:45:37 19 shorthand, is the value willingness to pay to
15:45:41 20 eliminate injury A plus injury B is the sum of the
15:45:48 21 willingness to pay to eliminate injury A alone plus
15:45:52 22 the willingness to pay to eliminate injury B alone
15:46:00 23 only if those two items are perceived by the
15:46:03 24 individual as independent. If they are perceived as
15:46:07 25 being to some degree substitute, the value of the

15:46:13 1 willingness to pay to eliminate A plus B is less than
15:46:16 2 the sum of the willingness to pay to eliminate A plus
15:46:22 3 the separate willingness to pay to eliminate B, which
15:46:26 4 you are assuming. And so the willingness to pay for
15:46:30 5 the river alone, what I'm calling B here, would be
15:46:33 6 greater than the quantity you just calculated if
15:46:37 7 respondents see these as to some extent substitutes,
15:46:41 8 and I think that's an entirely plausible assumption.
15:46:46 9 Q. On what do you base that assumption?
15:46:48 10 A. Well, other people in the literature have
15:46:52 11 studied the valuation of multiple items. Analogists
15:46:54 12 have found just such substitution.
15:47:05 13 Q. What literature?
15:47:09 14 A. Well, there is a paper by Hoehn &
15:47:11 15 Loomis -- two economics, H-o-e-h-n. So first let me
15:47:20 16 say I actually found signs of this, that the data in
15:47:26 17 question is the study that I conducted with John
15:47:30 18 Loomis. So the other author is spelled L-o-o-m-is.
15:47:31 19 Looking at wetlands in the San Joaquin Valley, a
15:47:37 20 contamination of drainage ponds affecting wildlife and
15:47:43 21 restoration of the San Joaquin River. So this is a
15:47:48 22 study valuing three items, and I found evidence that
15:47:52 23 they were substitutes, and Hoehn & Loomis in an
15:48:01 24 article, whose date I'm forgetting, found strong
15:48:07 25 evidence of substitution.

15:48:11 1 Q. Any other articles?
15:48:13 2 A. You know, there may be, but sitting here
15:48:16 3 now I don't recall papers that have looked at this
15:48:20 4 issue.
15:48:31 5 (Deposition Exhibit 10 was marked.)
15:48:35 6 Q. Dr. Hanemann, I've handed you what's been
15:48:37 7 marked as Deposition Exhibit No. 10, which is another
15:48:41 8 portion of the Montrose report, and if you would
15:48:45 9 direct your attention to page 212, it talks about the
15:48:48 10 "Univariate (Turnbull) Estimation of Lower-Bound Mean
15:48:52 11 Willingness To Pay."
15:48:54 12 A. Why don't you hold on a minute and let me
15:49:00 13 just read this section.
15:49:05 14 Q. Why don't we go off record while you do
15:49:09 15 that.
15:49:09 16 A. Sure.
15:49:09 17 THE VIDEOGRAPHER: Going off the record.
15:49:09 18 The time is 3:49.
15:58:07 19 (Recess taken, 3:49 p.m. to 4:00 p.m.)
15:59:48 20 THE VIDEOGRAPHER: Back on the record.
16:00:01 21 The time is 4:00.
16:00:05 22 MR. DEIHL: Would you please read back
16:00:07 23 the last question.
16:00:45 24 (The last question was read back as
16:00:45 25 follows: "Dr. Hanemann, I've handed you what's been

marked as Deposition Exhibit No. 10, which is another portion of the Montrose report, and if you would direct your attention to page 212, it talks about the "Univariate (Turnbull) Estimation of Lower-Bound Mean Willingness To Pay.")

Q. (BY MR. DEIHL) What estimation methodology was used in the Montrose study?

A. Without looking at a larger portion of the report and seeing the definition of these variables, I would have to say that I'm not completely sure. The factor here is that there is a significant terminological confusion. In particular, the phrase "Turnbull estimate" is used in several different ways, some of which are inappropriate, and that's something which I corrected or attempted to correct in how I drafted the text in Section 7.1 of this report.

So that said, I don't mean at all to be unhelpful, but I think -- so let me just elaborate. There are two different things going on actually that's pointed out in this report. There is figuring out the nonparametric graph of responses, if you like. Figuring out the nonparametric probability graph of saying yes to different amounts that makes it monotonic declining, and that graph is shown on page 7-4, Figure 7.1. And I alluded -- and the second

thing -- I'll come back to that graph.

The second thing is how you calculate a measure of value from that graph, and if you look at page 7.3, at the bottom of the page that's -- this is sort of -- this is laid out, so it's the bottom -- it's the last paragraph at the bottom of page 7.3, and it says. "the nonparametric ABERS" -- and ABERS is an acronym, A-B-E-R-S. "The non-parametric ABERS estimate is an estimate of the willingness-to-pay distribution at the dollar amounts used in the survey," $80 and so on. And so one issue is figuring out that distribution. "Once the distribution is known, a central tendency of the mean - the average of the willingness-to-pay distribution - is determined and applied across the population. Statistically, the mean of the distribution is the area under the graph obtained by connecting the points" in this figure and then this goes on to say there are different ways of connecting them. One way, which is the lower-bound mean, was actually introduced by two statisticians, Kaplan and Maya.

Some people refer to that lower-bound mean as the Turnbull mean. Turnbull's contribution is not to use that mean that comes from Kaplan and Maya. Turnbull's contribution is to -- is for interval data

16:04:43 1 to generate the -- essentially the graph in Figure
16:04:46 2 7.1. And if the data is a single bound, then that is
16:05:01 3 ABERS. If it's double bound it's Turnbull, but for
16:05:07 4 the monotonicity, Turnbull uses the ABERS procedure,
16:05:13 5 so that's the part of what he does that travels the
16:05:16 6 same route.
16:05:18 7 So as I sit here now I can't remember
16:05:26 8 whether this is single- or double-bound data that's
16:05:28 9 being used here.
16:05:30 10 Q. By "here," you mean in the Montrose
16:05:31 11 study?
16:05:31 12 A. Yes. So if it is, and Dr. Desvousges has
16:05:35 13 indicated that it's double bound, then it's the
16:05:39 14 Turnbull procedure which would generate a graph like
16:05:45 15 Figure 7.1.
16:05:45 16 The lower-bound mean that's calculated
16:05:48 17 from this, as I say, is actually something that was
16:05:52 18 already suggested by Kaplan and Maya, and that's
16:05:54 19 why -- that's the terminology that I would use for
16:06:07 20 that mean in this case, so I think that answers your
16:06:15 21 question.
16:06:22 22 Q. Okay. What was your involvement in
16:06:26 23 estimating past damages in this matter?
16:06:30 24 A. I am a coauthor of the report on past
16:06:33 25 damages.

16:06:37 1 Q. How much time did you spend on the
16:06:39 2 calculations associated with past damages?
16:07:03 3 A. I have thought about this issue myself,
16:07:05 4 and the approach that I would advocate over a period
16:07:11 5 of time, over a period of months, but this issue came
16:07:18 6 particularly to my attention in essentially at the end
16:07:28 7 of December when it became ripe, and I worked quite
16:07:37 8 intensively for a relatively small number of days
16:07:41 9 between when the issue became ripe and when this
16:07:45 10 report was concluded. I don't remember the exact
16:07:46 11 number of hours.
16:07:50 12 Q. When you say "the issue became ripe
16:07:52 13 towards the end of December," what do you mean?
16:07:54 14 A. Well, the estimation, the assessment of
16:08:01 15 the past damages was going to be based on -- in some
16:08:09 16 manner on the assessment we had made of the damages of
16:08:13 17 looking forward -- of the damages that had been
16:08:13 18 measured in the report that I'll call Chapman, et al.,
16:08:16 19 looking forward. But to do that analysis, one needed
16:08:22 20 to know the conclusion from the report in Chapman,
16:08:26 21 et al., and that conclusion -- I mean that number was
16:08:30 22 only developed in fairly late December reflecting the
16:08:35 23 fact that we only received the data, I think, in
16:08:39 24 mid-December. I'm vague on the exact dates, but
16:08:45 25 that's roughly the timing. So that's what determined

this. It was in a sense moot until we actually had the Chapman, et al., data and then it became ripe, so that's what I mean.

Q. What methodology did you employ to estimate past damages in this case?

A. Let me just review. The methodology was benefits transfer from the estimate of the value placed on the loss of services from the study we are referring to as Chapman, et al.

Q. What is a benefits transfer methodology?

A. A benefits transfer is using an estimate of value obtained for one item from one population at one point in time to value a comparable item, either the same or a different population, either the same or a different point in time.

MR. JORGENSEN: Can we pause for a second. The people on the phone e-mailed to say that for some reason this phone seems to have gone quiet just right now.

THE VIDEOGRAPHER: Going off the record. The time is 4:10.

(Discussion off the record.)

THE VIDEOGRAPHER: Back on the record. The time is 4:11.

Q. (BY MR. DEIHL) What factors affect the

16:10:50 1 accuracy of a benefits transfer method?
16:11:09 2 A. Two major factors: The accuracy of the
16:11:15 3 item -- of the value that's being transferred and the
16:11:18 4 comparability of the circumstance to which it's being
16:11:24 5 applied. The comparability of that to the
16:11:26 6 circumstances at which that original value was
16:11:30 7 estimated.
16:11:35 8 Q. Have you used a benefit transfer
16:11:37 9 methodology to estimate natural resource damages in
16:11:43 10 any other matters?
16:11:45 11 A. Yes.
16:11:45 12 Q. Which ones?
16:11:45 13 A. Gosh. There were -- well, the American
16:11:48 14 Trader case is one, but I worked on maybe half a dozen
16:11:54 15 natural resource damage cases for the State of
16:12:01 16 California between 1986 and the 1990s, in all of which
16:12:09 17 I used the benefits transfer, and it's a method that's
16:12:13 18 very widely used by other researchers in natural
16:12:18 19 resource damages and in other nonmarket valuations.
16:12:22 20 Q. What were those NRD cases in California
16:12:26 21 between '86 and the early '90s?
16:12:28 22 A. You know, it's been so long ago, I'm not
16:12:35 23 sure I remember them. I wrote a book chapter about
16:12:41 24 some of them, which is in my resume, but they involved
16:12:48 25 a variety of hazardous releases in various parts of

16:12:52 1 California.
16:13:00 2 Q. Are there any differences in the way you
16:13:01 3 use the benefits transfer methodology in those matters
16:13:05 4 compared to this matter?
16:13:20 5 A. I don't think there are essential
16:13:24 6 differences. An issue that has been raised in this
16:13:35 7 case is that this is a benefits transfer backwards in
16:13:41 8 time. In most, maybe all of the cases I did, for
16:13:48 9 example, the American Trader, it was a transfer
16:13:52 10 forward in time; that is, the study was conducted at
16:14:00 11 some prior time and it was being used to value
16:14:05 12 injuries occurring at some date after the study had
16:14:09 13 been performed. I regard that as an immaterial
16:14:15 14 difference, but that may be a difference between what
16:14:18 15 I did in those other cases and the report here.
16:14:26 16 Q. Any other differences?
16:14:28 17 A. I'm not aware of any.
16:14:30 18 Q. Was one of those cases where you did a
16:14:33 19 benefits transfer the Martinez oil spill?
16:14:37 20 A. Yes. So actually you remind me of some
16:14:41 21 differences in an important number of ways. This is a
16:14:45 22 simpler -- much simpler and more straightforward
16:14:48 23 benefits transfer than the other cases. This is the
16:14:52 24 same resources, the same injuries, essentially the
16:15:00 25 same type of injuries, and for the most part the same

people. The other cases involved different people and different resources that were being valued, and so this involved far smaller differences or far greater comparability than in the other benefits transfers.

Q. Why in this case do you say it's the same injuries?

A. Let me -- I'll answer that. Let me just go to the -- the key to the analysis is the statement on page 3 of this second report in the short paragraph, the second full paragraph. "The annual injuries on average" -- let me just put this in context. The Chapman, et al. study was valuing a flow of injuries starting in 2009 and running to 2058 in the case of river -- of the river. In 2068 in the case of the lake, and for simplicity I split the difference and refer to this as injuries running from 2009 to 2063.

This study of past injuries looks at injuries occurring over a shorter and different time period from 1981 to 2008, so those are the two different time periods. Then the key sentence is, "The annual injuries to the river and lake are sometimes larger in the earlier period and sometimes smaller. Overall, the average annual injuries are approximately comparable between the two periods."

That's the key.

Q. And how did you make the determination that overall the average annual injuries are approximately comparative between the two periods?

A. That was a determination made by the natural scientists, and the citation mentioned Stevenson, Koch & Walsh in personal communication with Rich Bishop, with Dr. Rich Bishop.

Q. And you are relying on these personal communications between Rich Bishop and Stevenson, et al. for that conclusion?

A. I'm relying on the conclusion of those scientists as conveyed to Dr. Bishop.

Q. Have you used the benefits transfer methodology in any other matter to hindcast willingness to pay at one site to estimate damages at the same site?

A. I haven't, but other researchers have done that. I'll mention two examples. Dr. Desvousges' colleagues working for Exxon, in the assessment of the Exxon Valdez oil spill looking at recreation damages, uses a recreation survey and values obtained from that after the spill and backcasted to that same site, and so the focus was the value of recreation data, that seemed the simplest.

16:19:16 1 Well, that was backcast to the same site to the same
16:19:20 2 population a year or two earlier.
16:19:22 3 In the lawsuit that the State of Montana
16:19:26 4 brought against Arco for the Upper Clark Fork River,
16:19:30 5 Dr. Desvousges himself used a survey calculated at one
16:19:35 6 point in time to calculate recreation impacts at an
16:19:39 7 earlier point in time, so it was a backcast of the --
16:19:41 8 to the same people in the same location, and I believe
16:19:48 9 that was also done in a natural resource damage
16:19:52 10 assessment in which Dr. Desvousges and David Chapman
16:20:00 11 participated, whose name I'm forgetting, but the
16:20:03 12 backcasting is actually very common in benefits
16:20:07 13 transfers involving recreation values where the study
16:20:16 14 is done.
16:20:18 15 Dr. Desvousges himself attempted to do
16:20:22 16 that in the American Trader case; that is, he set out
16:20:24 17 to conduct a recreation survey using data after the
16:20:28 18 oil spill and applied the recreation values to the
16:20:35 19 same site and the same people a little earlier in
16:20:37 20 time. During the oil spill he abandoned that study
16:20:43 21 for reasons I can only speculate on.
16:20:45 22 But in the measurement of -- let me just
16:20:50 23 back up. Whether backcasting occurs forward in time
16:20:54 24 or backwards in time is really determined by the
16:21:01 25 availability of data relative to what one wants to

16:21:05 1 measure, and in some cases there is a study in the
16:21:07 2 literature and you use it to value something occurring
16:21:11 3 at a date after the study was done. But in other
16:21:15 4 cases there is not an existing study. You are
16:21:16 5 commissioned to do the study, say, after an event has
16:21:20 6 occurred, and so you conduct a study now and backcast
16:21:22 7 to the time the event occurred, so it's -- that's very
16:21:30 8 commonplace in not just natural resource damages, but
16:21:35 9 valuation exercises.
16:21:43 10 Q. Does the accuracy of damages estimated
16:21:46 11 from hindcasting, a willingness to pay through this
16:21:50 12 benefits transfer methodology that we are talking
16:21:54 13 about, depend on the time period you use in the
16:22:01 14 past-damages calculation?
16:22:05 15 MS. XIDIS: Object to form.
16:22:09 16 A. It may or it may not. The passage of
16:22:15 17 time per se is not the crucial issue. The crucial
16:22:20 18 issue is whether there is reason to believe that the
16:22:24 19 values that the people to which -- for whom you are
16:22:30 20 backcasting place on the item have changed relative to
16:22:33 21 the values of the people whose study is the source,
16:22:37 22 and there is two things. Attitudes could have
16:22:41 23 changed, but also, for example, incomes could have
16:22:43 24 changed, so the people with the same attitudes that
16:22:46 25 are 20 percent richer might have a higher willingness

to pay because they are richer, so the degree of -- so to the extent the passage of time brings about a difference in income or to the extent that the passage of time is associated with a substantial change in attitudes, then that would be a factor that would need to be considered that would call for an adjustment in doing the benefits transfer. And as you know in this case neither of those factors applied.

Q. (BY MR. DEIHL) And why do you believe neither of those factors applied?

A. Well, we looked at them. I mean, it's an empirical question whether these factors apply. It's not a matter of economic theory or economic logic. So first of all, it happened to turn out that between 1980 and 2007, which was the most recent year available to us as opposed to 2008, real income was essentially the same in Oklahoma. It had -- some of the time it was lower, some of the time it was higher, but essentially there was the same average real income -- median real household income in Oklahoma in 1980 as 2007.

And also the evidence on attitudes, we looked at time series data from the general social survey, which gives information not for Oklahoma alone but for Region 7 of the country, which is Arkansas,

16:24:39 1 Oklahoma, Louisiana, and Texas. We did this
16:24:41 2 because I'm not aware of data specific to Oklahoma on
16:24:50 3 environmental attitudes which covers this span of
16:24:54 4 time. This span of time being from one of the
16:25:00 5 variables, 1973 to the present and the other 1985 to
16:25:03 6 the present, and this is shown in Figures 1 and 2 on
16:25:07 7 page 6 of the report. And the attitudes fluctuate
16:25:13 8 over that period, but basically on a variable -- on
16:25:16 9 both variables essentially attitudes were about the
16:25:22 10 same now as they were in the early '80s. There was a
16:25:28 11 period in the late '80s when there was a greater
16:25:30 12 sentiment to the environment, but sentiment has come
16:25:35 13 down a bit since then. And so in broad terms,
16:25:39 14 sentiment is about the same now as it was in the early
16:25:43 15 '80s.
16:25:48 16 Q. How did you select 1981 as the temporal
16:25:50 17 boundary for hindcasting willingness to pay in this
16:26:01 18 matter?
16:26:05 19 A. I think David Chapman may have been asked
16:26:20 20 that, but certainly he or maybe Dr. Bishop could give
16:26:24 21 you a more accurate answer and a more precise one;
16:26:31 22 that is, I wasn't involved in that determination. It
16:26:35 23 was -- I took it as given, and maybe the best thing is
16:26:39 24 for me not to speculate, but just stop there.
16:26:45 25 Q. You talked earlier about the accelerated

time frame you had to prepare this past-damages report.

A. Yes.

Q. What was your role as compared to the other authors of this report?

A. If you don't mind, I'm going to remind everybody I'm going to blow my nose. Could you repeat the question, please.

Q. What was your role in comparison to the other authors of this report?

A. I played a large role in the conceptual approach, laying out the conceptual approach that's employed here. Dr. Bishop supplied the information from the natural scientists that we've talked about. David Chapman supplied the references to -- the legal framework references to what CERCLA allows, the references which are on page 1, the references to DOI, the Department of Interior Regulations on the interest rates to be used in compounding and the treasury interest rates. David Chapman also, maybe with Dr. Bishop, wrote up the section on page 9 evaluating this benefits transfer using the guidelines or the protocol put out in the EPA documents on guidelines for preparing economic analyses. I was familiar with them in a general way, but David was more intimately

16:29:09 1 familiar.
16:29:16 2 Q. Did anyone other than the authors work on
16:29:20 3 this report?
16:29:24 4 A. Not that I know of.
16:29:26 5 Q. Did you receive input from any other team
16:29:30 6 members regarding this report?
16:29:33 7 A. There was input from our reviewers on
16:29:39 8 this report, and the writing of this -- I mean, the
16:29:45 9 issue of past damages had been discussed from time to
16:29:50 10 time in the team and I think all members or most
16:29:52 11 members of the team would have contributed to that
16:30:00 12 discussion, but as I say, when the issue crystallized
16:30:03 13 or became ripe right at the end, my recollection
16:30:09 14 sitting here and now is that it was the three team
16:30:13 15 members who are listed here who contributed to the
16:30:16 16 report.
16:30:20 17 Q. Turn back to your report, page 4-14,
16:30:26 18 please.
16:30:33 19 A. Yes.
16:30:35 20 Q. At the bottom of that page this -- well,
16:30:37 21 let me back up. Section 4.4 is entitled "Causes of
16:30:43 22 the Injury"; is that correct?
16:30:43 23 A. Yes.
16:30:45 24 Q. And the last paragraph on that page
16:30:46 25 reads. "Scientists have measured how much phosphorus

comes into the river and lake from different sources. They have found that about 60 percent of the phosphorus in the river and lake is from chickens and turkeys. The other 40 percent comes from sewage treatment plants, fertilizers bought in stores, and other sources." Why did you include the reference to chickens and turkeys?

A. As opposed to what?

Q. Well, the purpose of this survey is to value damages to the Illinois River Watershed from phosphorus irrespective of the source, correct?

A. That's correct.

Q. So why did you specifically call out chickens and turkeys?

A. I'm not sure I understand the question, but let me try and answer it. It was appropriate, I think, in developing a narrative about the injury to explain to people how the injury came about. That's in fact something that many respondents asked in focus groups before we had developed that part of the narrative. So I think to make this -- I used the language before, I think, of a realistic scenario. It's necessary to explain how it came about, and the largest single source, as I understand, is collectively the poultry industry or chickens and

turkeys. So it seemed to me that we had to say something about how it came about, and in that context, the poultry industry looms large and it would have been odd to somehow stay silent about their role.

Q. Why didn't you just say that 60 percent of the phosphorus comes from the spreading of turkey litter by farmers on their fields?

A. Well, let me just look at our narrative for a moment. Well, as I said, a question that was asked is, How did this problem come about? And let me just step back for a moment. The context is a change between circumstances around 1960, and we've talked about the dates used and circumstances now. And the salient feature is that there has been a substantial change in water quality, so people asked and would want to know, so how did the change occur? And if one just said, Well -- if one used the language you used, that wouldn't explain the nature of the change. The nature of the change was the change in the scale of chicken and turkey production over that period.

Q. The change is also attributable to sewage treatment plants, fertilizers bought in stores, and other sources, right?

MS. XIDIS: Object to the form.

A. It's attributed to those sources exactly

16:34:46 1 in this -- in the instrument.
16:34:52 2 Q. (BY MR. DEIHL) So why in the instrument
16:34:52 3 didn't you specify the percent that came from sewage
16:35:00 4 treatment plants, for example?
16:35:07 5 A. We aggregated. You have one major source
16:35:11 6 and then a number of smaller sources, and it was
16:35:16 7 appropriate, I think, to aggregate the smaller
16:35:18 8 sources.
16:35:22 9 Q. Take a look at page 1-7 of the main
16:35:26 10 report.
16:35:39 11 A. Yes, I'm looking at it.
16:35:45 12 Q. In the middle of the paragraph labeled
16:35:46 13 "The Problem," it states, "Next, participants were
16:35:52 14 informed that the State of Oklahoma has asked for an
16:35:54 15 injunction that would ban all future spreading of
16:36:00 16 poultry waste in the basin." Do you see that?
16:36:03 17 A. Yes.
16:36:05 18 Q. Why did you mention the injunction?
16:36:09 19 A. Well, that created the baseline relative
16:36:11 20 to which we would accelerate the injuries.
16:36:16 21 Q. And what were you trying to convey to the
16:36:26 22 respondents by mentioning the injunction?
16:36:37 23 A. As I see it, the logical structure of the
16:36:43 24 problem had two elements: One, you had the
16:36:46 25 introduction of new amounts of phosphorus day by day,

week by week and so on.

And the second is you had the accumulation of phosphorus introduced into the watershed in the past, and so if you needed -- if you wanted to eliminate the injury, logically two sorts of actions had to be taken: One, stop adding new phosphorus and then, two, somehow eliminate or contain the effects of this legacy of past phosphorus, and I think that was well understood by focus group respondents and for that matter I think survey participants.

So if you wanted to present people with a tradeoff, and the tradeoff is you restore the situation to 1960, using that as a shorthand, you have to describe some mechanism which deals with both steps.

Now, as it happened, the state had applied for a ban. The ban, as I understand it, wasn't granted at the time, but nevertheless throughout much of this period it was something in which the state had applied for. Let me mention I don't know the date of the application, but in terms of the narrative that satisfied one of the two logical steps that had to occur. And so that was one step.

Then the other step was some mechanism

16:38:33 1 that would deal with the legacy problem and that was
16:38:35 2 the alum program, but you needed a program which would
16:38:39 3 accomplish both ends: Stopping the introduction of
16:38:43 4 new phosphorus to the watershed or controlling it
16:38:46 5 greatly and then dealing with the legacy, and that was
16:38:48 6 the reason for introducing the ban into this scenario.
16:39:00 7 Q. Why not just tell the respondents that
16:39:01 8 the phosphorus loading would stop?
16:39:05 9 A. Because that's something that I think the
16:39:13 10 respondents wouldn't believe, wouldn't find credible
16:39:18 11 and would sort of say, So how come it stops? I don't
16:39:20 12 think that would have been credible, so you needed a
16:39:24 13 reason why it would stop. It wasn't enough to say it
16:39:30 14 would stop.
16:39:31 15 Q. Why not just tell them that the State of
16:39:33 16 Oklahoma was going to stop it?
16:39:50 17 A. I don't know if -- I don't want to
16:39:54 18 speculate too much. I don't want to speculate,
16:40:00 19 period. I don't know if that would have been
16:40:03 20 credible; the governors of Oklahoma would wave a wand
16:40:11 21 and these discharges would stop. The fact is this was
16:40:20 22 a plausible mechanism the state was applying, and
16:40:26 23 respondents continued to find it plausible throughout
16:40:28 24 the duration of the survey.
16:40:33 25 Q. Isn't it true that the state has a

16:40:33 1 regulation limiting the amount of turkey litter that
16:40:43 2 farmers can apply to their fields?
16:40:48 3 A. The short answer is I don't know. I
16:40:52 4 don't know.
16:41:03 5 Q. Previously we talked about, quote, that
16:41:05 6 60 percent of the phosphorus was generated from turkey
16:41:11 7 and chicken litter. Where did -- what's the basis for
16:41:15 8 that statement?
16:41:16 9 A. I think -- well, the answer is the
16:41:22 10 natural scientists. And I think the section of the
16:41:26 11 report we were looking at, I forget the page --
16:41:28 12 Q. It's page 4-14.
16:41:30 13 A. Yes. I think there is a specific
16:41:31 14 citation to a report by Engel.
16:41:37 15 Q. So, again, you are relying on what the
16:41:39 16 natural scientists told you?
16:41:39 17 A. Yes, that's correct.
16:41:45 18 Q. Let me take a quick look at my notes and
16:41:45 19 I think I may be finished.
16:41:46 20 A. Sure.
16:41:48 21 THE VIDEOGRAPHER: Going off the record.
16:41:54 22 The time is 4:42.
16:46:48 23 (Recess taken, 4:42 p.m. to 4:49 p.m.)
16:48:52 24 THE VIDEOGRAPHER: This marks the start
16:49:18 25 of Tape 4 of the videotaped deposition of Michael

16:49:20 1 Hanemann. Back on the record. The time is 4:49.

16:49:24 2 EXAMINATION

16:49:24

16:49:24 3 BY MR. JORGENSEN:

16:49:26 4 Q. Dr. Hanemann, I'm Jay Jorgensen.

16:49:30 5 A. It's nice to meet you.

16:49:30 6 Q. Nice to meet you. Thank you for taking

16:49:31 7 the time to talk with us. I'll try to be brief, and

16:49:33 8 my questions are -- I'm not an economist, so they are

16:49:37 9 much more simple than many of the questions you've

16:49:39 10 dealt with today. I think they are going to be fairly

16:49:41 11 straightforward, but if you have any -- it's the same

16:49:43 12 rules as this morning. If you have any questions,

16:49:45 13 don't hesitate to ask me. If you need a break, don't

16:49:48 14 hesitate to let me know and we'll take a break.

16:49:50 15 A. I appreciate that. Thank you.

16:49:52 16 Q. So, Dr. Hanemann, would you agree that

16:49:54 17 what people are willing to pay for a good or a service

16:50:03 18 varies based on the characteristics of the population

16:50:05 19 in question?

16:50:07 20 MS. XIDIS: Objection to form.

16:50:09 21 A. I would agree that it varies on the

16:50:13 22 characteristics of the people in question.

16:50:15 23 Q. (BY MR. JORGENSEN) And are some of the

16:50:15 24 characteristics that cause that variance the current

16:50:18 25 disposable income of the population in question?

16:50:22 1 A. That's a factor that could influence a
16:50:26 2 person's willingness to pay.
16:50:26 3 Q. And is another factor the individual's
16:50:30 4 projection of their future income?
16:50:33 5 MS. XIDIS: Objection to form.
16:50:37 6 A. I'm not sure what you mean by
16:50:37 7 "projection," so let me just emphasize. The time
16:50:43 8 period, that is, depends on the time period of
16:50:48 9 payment, and so we were interviewing people at the end
16:50:52 10 of 2008 talking about payment that would occur in
16:51:00 11 2009.
16:51:01 12 Q. (BY MR. JORGENSEN) I'm glad you
16:51:03 13 clarified. So to be clear, is it true that what a
16:51:11 14 person is willing to spend on a good or service today
16:51:15 15 varies based on what they believe they will have in
16:51:18 16 income over the time of payment; is that what we're
16:51:20 17 agreeing on?
16:51:24 18 MS. XIDIS: Objection to form.
16:51:26 19 A. Whether it varies, how much it varies are
16:51:26 20 empirical questions, so I don't know the answers to
16:51:31 21 those questions. One would have to measure that.
16:51:35 22 Q. (BY MR. JORGENSEN) As a matter of
16:51:35 23 economic theory, would you expect that what a person
16:51:39 24 would be willing to spend on a good or service today
16:51:41 25 would vary based on how much money they thought they

would make over the time that they would be required to submit the payment?

MS. XIDIS: Objection to form.

A. Economic theory -- there is no economic theory of expectations, and so I don't think that's a matter of economic theory. Just to repeat, it's an empirical question. If someone interviewed in November 2008 about a payment that would be imposed on them in 2009, it's an empirical question what a person -- we are asking individuals to assess this and it's an empirical question what factors they took into account in the assessment, and to the extent one of those factors was some sort of expectation, it's an empirical question. What was the nature of the expectation?

Q. (BY MR. JORGENSEN) Okay. I believe you're talking about the work that you actually did in this case, so let me turn to that. Did you ask the individuals that participated in the survey what their expectation of future income was?

A. No, we didn't.

Q. Did you attempt to do the empirical measurement that you have just discussed?

A. No, because it wasn't material.

Q. Now, why was it not material?

16:53:03 1 A. I'll answer in a moment. Let me just go
16:53:05 2 to the -- just to remind you. The context is we are
16:53:24 3 valuing these injuries by creating a tradeoff in which
16:53:28 4 the injuries can be eliminated. I mean, the
16:53:33 5 acceleration in the reduction in the injuries can be
16:53:37 6 affected by making -- by agreeing to make a payment in
16:53:41 7 2009. And so we present people with this tradeoff in
16:53:45 8 the vote, and we are looking at how they make the
16:53:50 9 tradeoff. And we look at it -- we look at the
16:54:01 10 tradeoff they make, and that tradeoff is the value at
16:54:07 11 the point in time the survey was conducted for this
16:54:11 12 injury, which is what we sought to measure, and so no
16:54:15 13 information would have been added -- no useful
16:54:16 14 information would have been added by asking what they
16:54:20 15 expected their income to be in 2009.
16:54:24 16 Q. So, just to clarify, you asked the
16:54:26 17 respondents in 2008 what they would be willing to pay
16:54:30 18 in 2009?
16:54:31 19 A. We asked them if they would be willing to
16:54:33 20 vote now for a program which would impose a payment in
16:54:39 21 2009 of $80 or $125 or whatever.
16:54:43 22 Q. So am I correct in saying that you asked
16:54:45 23 them during the year 2008 what they would be willing
16:54:46 24 to pay in the year 2009?
16:54:48 25 MS. XIDIS: Objection to form.

16:54:52 1 A. I'm not sure that it would be correct.
16:54:52 2 We asked them to make a tradeoff in 2008, which would
16:55:01 3 involve their being forced to make a payment in 2009,
16:55:05 4 so . . .
16:55:07 5 Q. (BY MR. JORGENSEN) And what were they
16:55:09 6 trading off in 2008 in exchange for the payment that
16:55:11 7 they would make in 2009?
16:55:13 8 A. They were trading off the accelerated
16:55:18 9 reduction in the injuries.
16:55:20 10 Q. Okay. So to clarify, you asked people
16:55:22 11 were they willing to obtain an accelerated reduction
16:55:26 12 in injuries, and you asked them that in 2008, and they
16:55:30 13 would begin to receive that benefit in 2008 in
16:55:31 14 exchange for a payment they would make in 2009?
16:55:33 15 MS. XIDIS: Objection to form.
16:55:33 16 A. No. The reduction would start in 2009 --
16:55:41 17 Q. (BY MR. JORGENSEN) I'm glad you
16:55:41 18 clarified that.
16:55:37 19 A. -- but the payment would be made in 2009.
16:55:43 20 Q. Okay. So to make sure that it's clear on
16:55:45 21 the record, because it's -- for people who aren't
16:55:46 22 sitting in the room, it's often difficult. So during
16:55:50 23 the year 2008, you posed questions to respondents, and
16:55:52 24 those questions asked them whether they would be
16:56:00 25 willing to make a payment in 2009 in exchange for

something they would begin to receive in 2009?

MS. XIDIS: Objection to form.

A. We asked them to make a decision in 2008, which would commit them to receive a flow of benefits starting in 2009 and which would commit them to a payment in 2009.

Q. (BY MR. JORGENSEN) Okay. And it's your testimony that what the individuals expected to make in 2009 would be in all instances irrelevant to that decision?

A. No. I'm saying it would be relevant to them, but it was immaterial to us to know that. We just needed to know how they made the tradeoff.

Q. I'm glad we clarified. So as to the respondent what they would make in 2009 at the time they had to make the payment would be relevant to them in what they were willing to pay?

A. Presumably. It's a matter of speculation. Let me put it this way: Neither you nor I know what factors they considered.

Q. Okay. Good. Separately from the respondents as a -- let me just cover a little bit of your background. What is your area of expertise?

A. I am an environmental economist. I'm an economist and I have studied people's attitudes and

16:57:22 1 preferences in a variety of contexts, including
16:57:26 2 preferences and attitudes for environmental resources,
16:57:30 3 particularly water-based resources.
16:57:35 4 Q. Thank you, Dr. Hanemann. Now, are you an
16:57:39 5 expert in limnology?
16:57:41 6 A. I'm not an expert in limnology.
16:57:43 7 Q. How about microbiology?
16:57:45 8 A. No.
16:57:45 9 Q. Or microbial source tracking?
16:57:46 10 A. No.
16:57:46 11 Q. Watershed modeling?
16:57:48 12 A. No.
16:57:48 13 Q. Modeling of any sort?
16:57:50 14 A. Yes.
16:57:50 15 Q. What type of modeling are you an expert
16:57:54 16 in?
16:58:00 17 A. Well, economic modeling of various sorts.
16:58:03 18 Q. Okay. Epidemiology, are you an expert in
16:58:03 19 epidemiology?
16:58:07 20 A. I'm not an expert in epidemiology.
16:58:09 21 Q. How about toxicology?
16:58:11 22 A. I'm not an expert in toxicology.
16:58:13 23 Q. Soil science?
16:58:15 24 A. I'm not an expert in soil science.
16:58:15 25 Q. Are you an expert in the agronomic

16:58:16 1 practices of the Midwest?
16:58:20 2 A. I'm not an expert in the agronomic
16:58:20 3 practices of the Midwest.
16:58:24 4 Q. Okay. That's helpful to draw boxes for
16:58:26 5 me. So as an economist, would you -- would what --
16:58:31 6 let me strike that. Let me start over again.
16:58:33 7 As an economist, would you agree that
16:58:35 8 what people are willing to pay for a good or service
16:58:39 9 can vary based on how much they need that good or
16:58:43 10 service?
16:58:43 11 MS. XIDIS: Objection to form.
16:58:50 12 A. I'm not sure that I would agree. It can
16:58:52 13 vary with assessment of the service whether that
16:59:00 14 assessment involves their need for it or their
16:59:01 15 appreciation of it.
16:59:05 16 Q. (BY MR. JORGENSEN) So would you agree
16:59:05 17 that what a person is willing to pay for a good or
16:59:09 18 service can vary based on their own assessment of how
16:59:13 19 much they need that good or service?
16:59:15 20 MS. XIDIS: Objection to form.
16:59:24 21 A. I'm not sure -- I mean, their assessment
16:59:26 22 can be based on many considerations. I'm not in a
16:59:30 23 position to say what those considerations are.
16:59:31 24 Q. (BY MR. JORGENSEN) So you would not
16:59:31 25 agree that a person dying of thirst in the desert

would be willing to pay more for water than someone who has adequate water for their needs?

MS. XIDIS: Objection to form.

A. Well, you were talking a person's valuation for a good or service. There are many different types of goods and services. The fact is that a person who would come into consideration is unlikely to vary not only with the people, but the type of good or service we are talking about, so I think it would be useful to limit this discussion to some particular good or service.

Q. (BY MR. JORGENSEN) Well, my question is: As an economist, would you agree that an individual is -- what they are willing to pay for a good or service will vary based on their own subjective estimate or evaluation of how much they need that good or service?

MS. XIDIS: Objection to form.

A. It depends.

Q. (BY MR. JORGENSEN) On what?

A. It depends on what factors. It depends on the particular good or service, the particular person, and how that person assesses that particular item.

Q. Okay. Back to my water example. Would

you agree as an economist that a person who was dying of thirst would be willing to pay more for water than a person who was not?

MS. XIDIS: Objection to form.

A. As an economist, I have no opinion; that is, I don't think economic theory is informative on this point. If you are asking as a matter of common sense, I think it depends, but it is possible that a person's lacking water in the desert would take into consideration his perceived need for the water.

Q. (BY MR. JORGENSEN) You're not aware of a body of economic research that addresses whether or not -- whether what an individual is willing to pay whether that will vary based on their own perceived need?

A. The answer is no. Let me say "needs" is not a term of art in economics. It's a term of art, I think, in psychology or some other field, but it's not a term of art in economics.

Q. What term would you use?

A. I guess I would say a person's willingness to pay for an item would depend on his assessment of the item, including the satisfaction the item could give him.

MR. JORGENSEN: Let's take just a moment

17:02:03 1 to break. We seem to have some dialing going on.
17:02:05 2 THE VIDEOGRAPHER: Going off the record.
17:02:07 3 The time is 5:02.
17:03:16 4 (Pause in proceedings.)
17:02:07 5 THE VIDEOGRAPHER: Back on the record.
17:03:22 6 The time is 5:03.
17:03:26 7 Q. (BY MR. JORGENSEN) Dr. Hanemann, would
17:03:28 8 you agree that what people are willing to pay for a
17:03:30 9 good or service varies based on their perception of
17:03:33 10 whether there are other options or replacements for
17:03:35 11 that good or service?
17:03:37 12 A. Yes.
17:03:39 13 Q. Would you agree, Dr. Hanemann, that what
17:03:41 14 people are willing to pay for a good or service varies
17:03:43 15 based on their other spending priorities?
17:03:46 16 A. Yes.
17:03:48 17 Q. What did you do in this case,
17:03:50 18 Dr. Hanemann, to assess the other spending priorities
17:03:54 19 of the survey respondents?
17:04:01 20 A. I think there is a category mistake
17:04:03 21 taking place here. It's the respondents who make the
17:04:07 22 tradeoff, so it's the respondents who assess their
17:04:09 23 other priorities. I, the researcher, don't need to
17:04:15 24 assess their other priorities. I present the
17:04:16 25 tradeoff. They are free to make it. So the answer is

I didn't measure their other priorities. I just measured how they would make this tradeoff. But following best practices recommended by the NOAA panel, I reminded them that they had other priorities; that there were other things they could do with the money.

Q. And, Dr. Hanemann, this might seem a little artificial, but it makes the record read better. What did you do in this case to assess the current disposable income of the survey respondents?

MS. XIDIS: Objection to form.

A. We asked a question -- let me find the question before I speak. We asked a question about their total family income. Disposable income is a term of art, but it has no specific -- no specific definition, and so that made it a problem -- that would make it problematic for use in the survey, because we would have to define, and as I say, there is not a ready definition, but question 53 asked about their income.

Q. (BY MR. JORGENSEN) And, Dr. Hanemann, what did you do in this case to assess the survey respondents' projection of their future needs?

A. Nothing. To repeat, we asked them to make a tradeoff based on whatever considerations were

important to them.

Q. Dr. Hanemann, what did you do in this case to assess how much the survey respondents believed that the good you were talking to them about was needed?

MS. XIDIS: Objection to form.

A. They assessed whether it was needed however they define need and made the tradeoff and what was important. Again, this is a category mistake. They assess the need. I just set up the tradeoff. Set up tradeoff and observe how they make that.

Q. (BY MR. JORGENSEN) And, Dr. Hanemann, what did you do in this case to advise the survey respondents -- strike that. Let me start over again.

Dr. Hanemann, what did you do in this case to evaluate whether the survey respondents perceived that they had other options or replacements for the good in question?

A. I'll answer in a moment. Would you mind repeating the question?

(The last question was read back as follows: "Dr. Hanemann, what did you do in this case to evaluate whether the survey respondents perceived that they had other options or replacements for the

17:08:07 1 good in question?")
17:08:28 2 A. We informed people that there were other
17:08:31 3 options in two parts of the survey. We presented that
17:08:37 4 information on page A-14. We pointed out that many of
17:08:45 5 the rivers and lakes in Oklahoma did not have excess
17:08:48 6 algae and we showed a map and then we showed that some
17:08:52 7 do and those included not just the Illinois River, but
17:09:01 8 some others, so in that sense that's one part of
17:09:03 9 showing substitutes.
17:09:03 10 And then before they voted, we cautioned
17:09:05 11 them why they might want to vote against the
17:09:11 12 treatment, and those reasons included many rivers and
17:09:15 13 lakes in Oklahoma do not have excess algae. Other
17:09:18 14 rivers that do have excess algae wouldn't be affected
17:09:20 15 by these treatments. The tax increase might be more
17:09:24 16 than your household can pay. If the state -- and
17:09:28 17 another, if the state does increase your taxes, you
17:09:30 18 may prefer that it spend money on other issues or on
17:09:31 19 issues other than the environment and so on.
17:09:35 20 So we reminded them of these alternatives
17:09:37 21 and then we observed their choice. We didn't assess
17:09:41 22 how they considered these factors, but we made sure
17:09:45 23 those factors were squarely in front of them, which is
17:09:48 24 the admonition of the NOAA panel and would be
17:09:52 25 considered -- is considered the best practice and is

17:09:54 1 the standard practice in stated preference involving
17:10:01 2 both choice experiments as well as contingent
17:10:03 3 valuation.
17:10:07 4 Q. (BY MR. JORGENSEN) This is my last
17:10:09 5 question on this line, Dr. Hanemann, or last group of
17:10:13 6 questions. Would you agree that what people are
17:10:15 7 willing to pay for a good or service varies based on
17:10:18 8 their projection of their wealth in the future?
17:10:22 9 MS. XIDIS: Objection to form.
17:10:24 10 A. Again, it's an empirical question what
17:10:28 11 factors people take into account. It's certainly
17:10:31 12 possible that they considered their income or wealth
17:10:35 13 during the period in which their payment is made, but
17:10:39 14 it's an empirical question.
17:10:39 15 Q. (BY MR. JORGENSEN) And here I mean
17:10:41 16 beyond the payment, and perhaps I can clarify. Is it
17:10:46 17 possible that -- let me strike that. Let me begin
17:10:48 18 again.
17:10:50 19 Would you agree that what people are
17:10:50 20 willing to pay for a good or service varies based on
17:10:54 21 what they anticipate their wealth to be beyond the
17:11:01 22 period of payment?
17:11:01 23 MS. XIDIS: Objection to form.
17:11:05 24 A. It's an empirical question, as I said
17:11:07 25 before, what factors they take into consideration and

how they weigh them.

Q. (BY MR. JORGENSEN) Would you agree, Dr. Hanemann, that their decisions can vary based on all the factors we have just discussed?

A. It's certainly -- it's possible that the factors you have discussed may be factors which people or some of the people took into consideration.

Q. Is it true, Dr. Hanemann, that the amount people say they are willing to pay for a good depends in part on the circumstances under which they are asked?

MS. XIDIS: Objection to form.

A. What do you mean by the circumstances under which they are asked?

Q. (BY MR. JORGENSEN) Well, for instance, whether they are asked in a rushed situation or in a situation where they can contemplate the question?

A. That's an empirical question. I can imagine that it makes no difference. The issue is so obvious to them that even though they are rushed, they give an answer. The survey was conducted in people's home in a setting and circumstances that I don't believe were rushed. The opposite.

Q. And perhaps I am -- perhaps I need to restate, Dr. Hanemann. Why is it -- let me ask it

this way: Why is it important to you that people were asked in their homes?

MS. XIDIS: Objection to form.

A. I'm referring -- if I may go back to a particular sentence in the -- in Exhibit 7. Let me just -- well, I would like -- let me just back up. The optimal situation would be that they respond in a setting that allows them to reflect and give a considered opinion. And if I can just say the context in which I was discussing this was kind of a contrast with the setting in which Dr. Desvousges conducted surveys, which was an intercept survey of many young people in a shopping mall.

Q. (BY MR. JORGENSEN) So it's true that you've criticized Dr. Desvousges for the circumstances in which he asked people a contingent valuation question; isn't that correct?

MS. XIDIS: Objection to form.

A. That is correct.

Q. (BY MR. JORGENSEN) And so building on that, isn't it true that the amount that people say they are willing to pay for a good depends in part on the circumstances under which they are asked?

MS. XIDIS: Objection to form.

A. If by "circumstances" you mean does it or

it may make a difference if responses are given in a mall intercept versus an in-person interview -- an in-person survey, I would say the answer is yes. I think this was reflected by the NOAA panel's disdain from all intercepts and recommendation for in-person interviews.

Q. (BY MR. JORGENSEN) And in addition to the -- strike that. Let me start over again.

And in addition to whether or not the person is rushed in giving the answer, isn't it true that the amount that people say they were willing to pay for a good will depend in part who is asking?

MS. XIDIS: Objection to form.

A. I'm not sure. I don't know.

Q. (BY MR. JORGENSEN) In your expert opinion, does it not suggest -- strike that. Let me start over again.

In your expert opinion, Dr. Hanemann, does it not make a difference who the respondent perceives the questioner to be?

A. If you mean -- maybe do you mean the sponsor of the survey?

Q. Yes.

A. The evidence -- I think a question like this was asked of either Dr. Tourangeau or

17:15:07 1 Dr. Krosnick. They are familiar with the surveyed
17:15:13 2 literature on this topic and I'm not. My recollection
17:15:16 3 is -- I'll tell you what they said and it's consistent
17:15:22 4 with my impression of the literature, but I would
17:15:24 5 defer to their judgment. The sponsor affects whether
17:15:28 6 a person is willing to participate in a survey, but
17:15:33 7 there isn't evidence that it affects how the person
17:15:35 8 participates, what response the person gives, given
17:15:41 9 that he has or she has decided to participate.
17:15:45 10 Q. In conducting a contingent valuation
17:15:46 11 survey, Dr. Hanemann, isn't it important that there
17:15:48 12 not be an express or implicit suggestion of the
17:15:52 13 socially appropriate answer?
17:15:54 14 MS. XIDIS: Objection to form.
17:16:00 15 A. It is one -- it's optimal to avoid social
17:16:11 16 desirability effects, and I believe we avoided those
17:16:13 17 effects very well in this survey.
17:16:16 18 Q. (BY MR. JORGENSEN) And when you say it's
17:16:16 19 important to avoid social desirability, you mean that
17:16:20 20 if people feel like a certain answer is the right
17:16:22 21 answer, the socially acceptable answer, that they
17:16:26 22 might give that answer whether they believe it or not?
17:16:30 23 MS. XIDIS: Objection to form.
17:16:30 24 A. No. The empirical evidence is that
17:16:31 25 that's not the case in a well-designed and

17:16:33 1 well-conducted survey.
17:16:37 2 Q. (BY MR. JORGENSEN) But it can happen if
17:16:39 3 the survey is not well-designed and well-conducted?
17:16:41 4 MS. XIDIS: Objection to form.
17:16:43 5 A. It's believed that -- I'm not sure what
17:16:46 6 the empirical evidence there is on social desirability
17:16:52 7 effects in surveys of various sorts in general. Jon
17:17:00 8 Krosnick, I think, is the person you would need to ask
17:17:03 9 about that.
17:17:03 10 Q. (BY MR. JORGENSEN) Contrary to what you
17:17:05 11 just said, Dr. Hanemann, you've written about this,
17:17:05 12 haven't you?
17:17:07 13 MS. XIDIS: Objection to form.
17:17:11 14 A. What are you referring to?
17:17:11 15 Q. (BY MR. JORGENSEN) I'm referring to your
17:17:13 16 peer-reviewed and published writings.
17:17:18 17 A. Yes.
17:17:20 18 Q. I'm sorry, which?
17:17:20 19 A. I would appreciate it if you pointed to
17:17:22 20 the text you are thinking of.
17:17:24 21 Q. Okay. Before we do, let me just ask: Do
17:17:26 22 you disagree that you have written about the
17:17:30 23 importance of not suggesting the socially acceptable
17:17:33 24 answer to the respondent?
17:17:37 25 MS. XIDIS: Objection to form.

17:17:39 1 A. Yes. I thought your question was is
17:17:41 2 there empirical evidence of the effect of that, and I
17:17:45 3 was saying I would defer to Jon Krosnick. But in
17:17:48 4 terms of how one designs a survey would be -- it seems
17:18:00 5 to me it would be desirable to avoid doing that. What
17:18:03 6 effect it has, whether it has a large effect or not, I
17:18:05 7 don't know and that's the sense in which I was
17:18:07 8 deferring to Dr. Krosnick.
17:18:09 9 Q. Dr. Hanemann, do you believe it's true
17:18:11 10 that all surveys are vulnerable to response effects?
17:18:16 11 A. You know, as a loose and general
17:18:43 12 statement, that's what I say in this paper, but the
17:18:50 13 experts on this, people who -- the experts on this are
17:18:54 14 Tourangeau and Krosnick, and so I'm writing as a
17:19:03 15 layperson who has worked with them, who has worked
17:19:07 16 with Pressor, but for an authoritative answer to that
17:19:13 17 question, that's not my expertise. It's the expertise
17:19:16 18 of survey professionals like them.
17:19:18 19 Q. And to clarify your answer, Dr. Hanemann,
17:19:20 20 were you just looking now at your article in the
17:19:24 21 Journal of Economic Prospectives entitled "Valuing the
17:19:24 22 Environment Through Contingent Valuation"?
17:19:28 23 A. Yes.
17:19:28 24 Q. And the some of the writing that you did
17:19:30 25 in there was as a layperson, not as an expert?

17:19:31 1 MS. XIDIS: Objection to form.
17:19:33 2 A. Yes. I was writing as an economist
17:19:35 3 summarizing my understanding of the survey research
17:19:39 4 literature, but I'm not a survey researcher. I'm not
17:19:41 5 a producer of that literature, but the context was --
17:19:45 6 these articles were written for economists,
17:19:48 7 commissioned of economists, and so we were standing
17:19:54 8 in. And as I say, I was summarizing my understanding
17:20:01 9 of the literature.
17:20:03 10 Q. (BY MR. JORGENSEN) Is this article the
17:20:03 11 only instance in your career where you have written
17:20:05 12 beyond your area of expertise?
17:20:07 13 MS. XIDIS: Objection to form.
17:20:11 14 A. In this article I was summarizing
17:20:13 15 literature from another field, and this is not the
17:20:20 16 only time I think I have summarized literature not in
17:20:26 17 my field, but relevant to work in my field.
17:20:28 18 Q. (BY MR. JORGENSEN) What is nonuse value
17:20:30 19 in the context of your work in this case?
17:20:33 20 A. Okay. To answer your question, values
17:21:31 21 arising from motives -- the value that a person may
17:21:31 22 hold for an item that is not associated with a motive
17:21:39 23 connected with that person's personal use of the item
17:21:41 24 is referred to as a nonuse value or a passive use
17:21:45 25 value.

17:21:45 1 Q. So am I correct in thinking that the
17:21:46 2 amount that people are willing to pay so that they
17:21:48 3 themselves can use a resource, that is not a nonuse
17:21:52 4 value?
17:22:00 5 A. That's correct.
17:22:01 6 Q. So like drinking water or swimming in
17:22:03 7 water, these are not examples of nonuse values?
17:22:09 8 A. Valuing in drinking water from a motive
17:22:13 9 focused on your own consumption of the water would be
17:22:16 10 a use value.
17:22:16 11 Q. Okay. So is nonuse value the value that
17:22:22 12 people put on something for knowing in their mind that
17:22:24 13 it exists?
17:22:26 14 MS. XIDIS: Objection to form.
17:22:30 15 A. That's I think too narrow a definition.
17:22:33 16 And, again, the extent to which that's an adequate
17:22:37 17 definition or an inadequate one sort of depends on the
17:22:43 18 particular item we are talking about and the relation
17:22:45 19 to those people, but the sort of broader concept or a
17:22:50 20 broader definition of nonuse value is a value
17:22:54 21 associated with an item for motives unconnected with
17:23:00 22 their own use of the item.
17:23:01 23 Q. (BY MR. JORGENSEN) And beyond knowing
17:23:03 24 that it exists and deriving satisfaction from it, what
17:23:05 25 would be examples?

17:23:07 1 A. Well, they are two different things:
17:23:09 2 Knowing that it exists and deriving satisfaction, so
17:23:11 3 you may derive satisfaction that it's protected or
17:23:15 4 that it's functioning well and so on.
17:23:16 5 Q. So in this case, Dr. Hanemann, to the
17:23:18 6 extent that the respondents included a nonuse value in
17:23:24 7 the numbers that have been put forth in this report,
17:23:28 8 that nonuse value is for knowing that the Illinois
17:23:31 9 River Watershed exists in an improved state than it
17:23:35 10 otherwise would?
17:23:35 11 MS. XIDIS: Objection to form.
17:23:37 12 A. Well, the language I would use is it's a
17:23:41 13 value which reflects the satisfaction they get from
17:23:45 14 seeing these injuries removed or removed quickly, more
17:23:52 15 quickly.
17:23:52 16 Q. (BY MR. JORGENSEN) But just to be clear,
17:23:52 17 not so that they themselves can use the resource, but
17:24:00 18 just so they can have that satisfaction?
17:24:01 19 A. The nonuse component would be that -- as
17:24:05 20 you've just said.
17:24:07 21 Q. Let me turn to how -- various ways that
17:24:13 22 one might value a good. I see that you have a can of
17:24:15 23 Dr Pepper in front of you. It'll help me if I have a
17:24:16 24 real world something to refer to. So what would you,
17:24:22 25 Dr. Hanemann, be willing to pay for a can of

17:24:24 1 Dr Pepper?
17:24:28 2 A. I don't know.
17:24:30 3 Q. What would you need to know?
17:24:31 4 A. I'm sorry. You were asking me what I
17:24:33 5 would pay --
17:24:35 6 Q. Yes.
17:24:35 7 A. You were asking me to use the jargon, an
17:24:39 8 open-ended question, what is the maximum amount I
17:24:41 9 would be willing to pay, and I myself in this context,
17:24:45 10 but the empirical evidence says, and this applies to
17:24:48 11 many people, would find it hard to tell you the most I
17:24:54 12 would be willing to pay sitting here and now. What
17:25:01 13 would be much easier is if you suggested a particular
17:25:05 14 price. You know, would you pay whatever price you
17:25:09 15 wish, $4 for that can, and the empirical evidence is
17:25:11 16 people find it much easier to think about and respond
17:25:16 17 to a particular question, so that's the sense in which
17:25:22 18 I answered. I don't know.
17:25:24 19 Q. Okay.
17:25:26 20 MR. JORGENSEN: Can we take just a
17:25:26 21 moment's break, because while we're talking about
17:25:26 22 Dr Pepper, I drank quite a bit. I will be quick.
17:25:26 23 THE VIDEOGRAPHER: Going off the record.
17:25:31 24 The time is 5:25.
17:29:30 25 (Recess taken, 5:25 p.m. to 5:29 p.m.)

17:29:26 1 THE VIDEOGRAPHER: Back on the record.
17:29:30 2 The time is 5:29.
17:29:33 3 Q. (BY MR. JORGENSEN) Dr. Hanemann, I want
17:29:35 4 to get a simplified but still correct understanding of
17:29:39 5 contingent valuation, so let me give one to you and
17:29:43 6 you to correct me. Is what contingent valuation does
17:29:46 7 three steps: One, select a population; two, survey
17:29:50 8 them to learn the value they place on a public good
17:29:54 9 and then three, times that value by the population
17:30:01 10 identified?
17:30:01 11 MS. XIDIS: Objection to form.
17:30:05 12 A. I would say that contingent valuation is
17:30:07 13 the second of those two steps. The first step is sort
17:30:13 14 of implicit. That's sort of a parameter as it were
17:30:18 15 set by the -- typically by the purpose of the client
17:30:20 16 for the study, and then contingent valuation is how
17:30:24 17 you survey them to develop a measure of the value for
17:30:30 18 the item, and then the extrapolation to the population
17:30:33 19 of interest, again, reflects the purposes of the
17:30:37 20 study.
17:30:39 21 Q. (BY MR. JORGENSEN) Okay. Were all three
17:30:39 22 of those steps performed in this case?
17:30:43 23 A. Yes.
17:30:46 24 Q. In terms of timings the value by the
17:30:50 25 population identified, let's return to the example of

17:30:52 1 the Dr Pepper. If I were to ask you, Dr. Hanemann,
17:30:54 2 are you willing to pay 50 cents for a Dr Pepper, what
17:31:03 3 would your answer be?
17:31:05 4 A. Yes.
17:31:05 5 Q. And if I were doing a contingent
17:31:07 6 valuation survey, I could ask that question to a
17:31:09 7 number of people and then I would -- how would I
17:31:15 8 arrive at the value of the Dr Pepper?
17:31:16 9 MS. XIDIS: Objection to form.
17:31:18 10 A. You asked a good question and let me just
17:31:22 11 explain. Economists -- there is a term in economics
17:31:24 12 of public good and that's contrasted with a private
17:31:30 13 good, and the valuation of public good is different
17:31:31 14 than the valuation of a private good. The essential
17:31:39 15 difference is public good is something that can be
17:31:43 16 valued and enjoyed by multiple people simultaneously,
17:31:50 17 whereas a private good can't, can only be enjoyed
17:32:00 18 typically by one person at a time, but let me give you
17:32:03 19 an example.
17:32:07 20 This can of Dr Pepper, you and I can't
17:32:09 21 drink the same Dr Pepper. I mean, you could take half
17:32:13 22 the can and I could take half the can, but we can't
17:32:15 23 drink the molecules of water. And so in that sense
17:32:18 24 each of us has a value, but -- and the typical maxim
17:32:22 25 in economics would be the highest and best use. You

17:32:28 1 may have a higher value than me, and so the value of
17:32:31 2 the can would be what it's worth to you rather than to
17:32:33 3 me, but the notion that the item would be valued in
17:32:37 4 its highest and best use, but implicit in that is
17:32:39 5 there is sort of one user at a time.
17:32:48 6 Public good by definition is something
17:32:52 7 that many people can enjoy at the same time, and one
17:33:00 8 person's enjoyment in no way diminishes another
17:33:03 9 person's access or enjoyment of the item, and that's
17:33:05 10 the sense in which we can't both drink the same
17:33:09 11 molecule of water. But we can both get satisfaction
17:33:13 12 from cleaning up air pollution or cleaning up water
17:33:16 13 pollution or preserving the White House. If I can
17:33:20 14 just give an example.
17:33:22 15 Only one person, one family can occupy
17:33:24 16 the White House at a time, but many people can get
17:33:28 17 satisfaction, say, from the preservation of the White
17:33:30 18 House, and if it were necessary to raise funds to, you
17:33:33 19 know, restore it, you know, it's entirely possible
17:33:37 20 that millions of people would gain satisfaction and
17:33:39 21 would contribute, but only one family can live there
17:33:43 22 at the same time. So by multiplying by the number of
17:33:48 23 people is something that's appropriate and is done as
17:33:52 24 standard practice for a public good but not for a
17:33:54 25 private good.

17:33:54 1 Q. Let's use your White House example, but
17:34:00 2 before we do, in this case, who selected the
17:34:01 3 population?
17:34:09 4 A. I don't know, and to be specific, I don't
17:34:11 5 know what discussions took place with the State of
17:34:16 6 Oklahoma. I don't know -- we or some of our team,
17:34:26 7 maybe David Chapman, may have proposed limiting the
17:34:30 8 survey to the population of Oklahoma. And as I
17:34:35 9 alluded to earlier, there are many pragmatic reasons
17:34:39 10 for wanting to do that, and so I am pretty sure we
17:34:43 11 would have -- that's what we would have recommended.
17:34:46 12 What I'm not sure is if that was already
17:34:48 13 sort of off the table as part of commissioning the
17:34:50 14 study or not, but if it was on the table, I think
17:34:54 15 that's something that we would have recommended for
17:35:01 16 practical reasons.
17:35:03 17 Q. And in the end, does the client decide
17:35:03 18 what the relevant population will be?
17:35:07 19 MS. XIDIS: Objection to form.
17:35:07 20 A. Well, the way I would put it is the
17:35:11 21 client commissions a study and we propose how to do
17:35:13 22 it, and in particular would propose what population to
17:35:16 23 cover, and it would be the client -- this is with
17:35:22 24 other studies, the client -- you make a
17:35:26 25 recommendation, but the client has to accept the

recommendation because the client is free not to, you know, pay for the study, not to commission you to do the study, and so in that sense the client has to accept the recommendation.

Q. (BY MR. JORGENSEN) And in your personal knowledge, Dr. Hanemann, you don't know who selected this population?

A. I don't, because as I say, I don't know if there were discussions or not. And as I've always said, if it had been -- my recommendation would have been to do that.

Q. But you believe that the plaintiffs made the ultimate decision?

MS. XIDIS: Objection to form.

A. I believe that -- well, that the State of Oklahoma would have -- would have -- the State of Oklahoma as the client had to approve what we did, and so in that sense as in any project, the client would make the ultimate decision. The client could reject a recommendation, decide not to go ahead with the study or not to go ahead with us doing the study, and in that sense it's the client's decision.

Q. (BY MR. JORGENSEN) Dr. Hanemann, you may have heard your counsel make an objection. There is rules about how lawyers have to ask questions, so with

17:36:48 1 apologies I'll ask that question again. Who do you
17:36:52 2 believe made the ultimate decision to select the
17:36:52 3 relevant population for your work in this case?
17:37:00 4 A. I don't know.
17:37:00 5 Q. Who do you believe?
17:37:01 6 A. I don't know. I don't have a belief.
17:37:03 7 Q. Did you make it?
17:37:05 8 A. No, I didn't.
17:37:05 9 Q. And in your normal practice would the
17:37:07 10 client make the ultimate decision?
17:37:09 11 A. Yes.
17:37:11 12 Q. Okay. So let's turn to the White House
17:37:15 13 example. So one way that you could value preserving
17:37:18 14 the White House -- strike that. Let me start over
17:37:20 15 again.
17:37:22 16 Let's turn to your White House example.
17:37:24 17 Would one way of valuing the cost of preserving the
17:37:26 18 White House be to make a list of things that need to
17:37:28 19 be done and what they would cost and then you have
17:37:33 20 your value?
17:37:33 21 MS. XIDIS: Objection to form.
17:37:35 22 A. In the sentence you said would one way of
17:37:35 23 valuing the cost of the White House, but I had talked
17:37:39 24 about valuing the White House, and that's something
17:37:43 25 different. So what it would cost to restore the White

17:37:45 1 House is one economic quantity and the value, let's
17:37:50 2 say, that people in America, households in America
17:37:54 3 would place on restoring the White House is a separate
17:38:00 4 economic quantity.
17:38:00 5 Q. (BY MR. JORGENSEN) Okay. And that is
17:38:01 6 precisely what I wanted to get at. So there can be a
17:38:05 7 difference between what it would cost to have a public
17:38:11 8 good achieve a certain condition and what people would
17:38:15 9 be willing to pay in use and nonuse values for that
17:38:18 10 same good to achieve that same condition?
17:38:22 11 A. Yes.
17:38:22 12 MS. XIDIS: Object to the form.
17:38:26 13 Q. (BY MR. JORGENSEN) Let's follow up on
17:38:26 14 this example. For instance with the White House,
17:38:28 15 let's hypothetically, and I'm asking you to take my
17:38:30 16 hypothetical. Let's say that all of the restorations
17:38:31 17 that anyone could want to the White House would cost
17:38:37 18 $10 million. That's this hypothetical. One way of
17:38:39 19 valuing the White House in a preserved state would be
17:38:45 20 $10 million; is that right?
17:38:48 21 A. No. That would be the cost of the
17:38:50 22 restoration of the White House.
17:38:54 23 Q. Okay. And the reason you said no is
17:39:00 24 because a contingent valuation would add a nonuse
17:39:03 25 value of what people -- the satisfaction people derive

17:39:07 1 from having the White House be in a pristine state?
17:39:09 2 MS. XIDIS: Objection to form.
17:39:11 3 A. No, I wouldn't put it that way.
17:39:13 4 Q. (BY MR. JORGENSEN) Okay. How would you
17:39:15 5 put it?
17:39:15 6 A. Well, economists make a distinction --
17:39:16 7 have made -- have long made a distinction between
17:39:22 8 demand and supply. They are both of interest, they
17:39:26 9 are both relevant, but they are different things, and
17:39:30 10 I want to relate that to the issue here. Supply has
17:39:33 11 to do with what an item costs. Demand can be a
17:39:37 12 revelation of the value of an item to people, what an
17:39:43 13 item is worth. Those are two separate things. And
17:39:48 14 when one talks -- in economics, this is in no way
17:39:52 15 limited to or specific to contingent valuation and
17:40:00 16 it's no way specific to nonmarket items or nonuse
17:40:05 17 values, but there is a distinction between what an
17:40:09 18 item is worth to an individual or a group of
17:40:11 19 individuals and what it might cost to make that item
17:40:15 20 available.
17:40:16 21 And so valuation and economics, whether
17:40:18 22 it's of a market good or a nonmarket good, a use value
17:40:22 23 or nonuse value aims to measure what the item is worth
17:40:26 24 to people, as I say, regardless of the item.
17:40:31 25 Q. And using the hypothetical that I laid

17:40:31 1 out, could you, as a scientist, conduct a contingent
17:40:37 2 valuation survey asking all Americans what they are
17:40:43 3 willing to pay to have a pristine and restored White
17:40:46 4 House?
17:40:48 5 A. You could do a contingent valuation
17:40:50 6 survey. You would need to sort of set up a situation
17:41:00 7 where the White House could be restored or whatever
17:41:03 8 the change is. You would also need to describe
17:41:09 9 convincingly why the people you are surveying should
17:41:13 10 have to make that payment, but I can imagine ways of
17:41:16 11 trying to do that, and then you would be able to
17:41:20 12 present the tradeoff to them. If it cost X, would you
17:41:24 13 be in favor of it, would you vote for it and so on,
17:41:26 14 and that would be a mechanism of measuring the
17:41:31 15 valuation of American households or whatever the
17:41:33 16 public was.
17:41:35 17 Q. And if -- I don't think either one of us
17:41:37 18 knows sitting here how many households there are in
17:41:41 19 America. Can we assume for this hypothetical that
17:41:43 20 there are 100 million?
17:41:45 21 A. Yes.
17:41:45 22 Q. So if there are 100 million American
17:41:46 23 households and you did what you said, and each
17:41:48 24 American household was willing to pay $100, what the
17:41:52 25 would contingent valuation of the White House be?

17:42:00 1 MS. XIDIS: Objection to form.
17:42:00 2 Q. (BY MR. JORGENSEN) 100 million
17:42:00 3 households, $100 each.
17:42:05 4 A. So, gosh. $10 billion. Let me just
17:42:15 5 correct one thing that you said, because in your
17:42:18 6 hypothetical you said something like all households
17:42:20 7 have a value of $100.
17:42:22 8 Q. That's my hypothetical, that the answer
17:42:24 9 is that the households value it at $100.
17:42:28 10 A. Right, but the point I wanted to
17:42:30 11 emphasize is the way we conceptualize this is there is
17:42:35 12 likely to be variation, so -- and not all households
17:42:39 13 would value the item the same way, and so one uses
17:42:45 14 something like an average or some measures of central
17:42:46 15 tendency.
17:42:48 16 Q. And in the work you did in this case, you
17:42:50 17 did just that, right?
17:42:50 18 A. Right.
17:42:50 19 Q. And you came to an average?
17:42:52 20 A. Yes.
17:42:52 21 Q. Is "average" the right word that I can
17:42:54 22 use?
17:42:54 23 A. Yes.
17:42:54 24 Q. So we are going back to my hypothetical.
17:43:00 25 If there are 100 million American households and the

17:43:03 1 average contingent valuation they put is $100, then
17:43:07 2 the contingent valuation worth of the White House is
17:43:11 3 $10 billion, correct?
17:43:11 4 MS. XIDIS: Objection to form.
17:43:13 5 A. I'll remind you we developed a
17:43:16 6 conservative estimate of the average, but if you
17:43:18 7 estimated the average value in whatever the population
17:43:20 8 is at $100 and the population had 100 million, the
17:43:30 9 total -- I mean, the aggregate value would be $10
17:43:33 10 billion.
17:43:33 11 Q. (BY MR. JORGENSEN) And does that
17:43:35 12 hypothetical illustrate the difference that I think
17:43:39 13 you were trying to explain before between the cost of
17:43:41 14 what it might take to fix up the White House and what
17:43:45 15 a contingent valuation might value the White House?
17:43:48 16 MS. XIDIS: Objection to form.
17:43:48 17 A. It illustrates the difference between the
17:43:54 18 economic concept of value, because what we are talking
17:44:00 19 about has nothing to do with contingent valuation;
17:44:01 20 that is, it has nothing to do with how the value per
17:44:05 21 household is computed. What we are talking about is
17:44:09 22 the aggregation of -- of two things: The aggregation
17:44:11 23 of value, but in the context of dealing with a public
17:44:13 24 good rather than a private good. And so, as I say, it
17:44:18 25 has nothing particular to do with the way value -- the

17:44:22 1 average value is estimated.
17:44:22 2 Q. (BY MR. JORGENSEN) Okay. I want to make
17:44:24 3 sure that that's correct, and I think what you are
17:44:26 4 driving at is that your point was that contingent
17:44:28 5 valuation is really just the second of these three
17:44:30 6 that I mentioned and that I'm confusing you, so let me
17:44:33 7 try this question again.
17:44:35 8 So am I correct that we have agreed you
17:44:39 9 could do a contingent valuation of the White House as
17:44:43 10 we have discussed?
17:44:45 11 A. Yes.
17:44:46 12 Q. And --
17:44:46 13 A. In principle.
17:44:48 14 Q. In principle. And in my hypothetical can
17:44:48 15 we agree there is 100 million American households?
17:44:52 16 A. Yes.
17:44:52 17 Q. And in my hypothetical I want you to
17:44:54 18 assume that you do all of the same type of work you've
17:45:01 19 done in this case, conservatism, interviews, all of
17:45:07 20 the methods that are laid out in your report and that
17:45:09 21 your final answer, just as you have a final answer, is
17:45:13 22 $100 per household. What would your report conclude
17:45:18 23 is the value of the White House using your method?
17:45:22 24 MS. XIDIS: Objection to form.
17:45:26 25 A. It would conclude it's $10 billion, but

let me just clarify one thing. I've said there are two separate issues. One is a public good versus a private good and the fact that for public good you would not look at the highest value among all the households. You would look at the -- some of the values. That point was first established in economics or was indisputably established around 1957 by Paul Samuelson writing the definitive article on public goods in a context completely divorced from contingent valuation or environmental goods, in other words. So that's the sense in which the issue we are talking about as I perceive it, is the question of valuing the public good and that comes out of logic of -- the definition of a public good comes out of a -- Samuelson presented a mathematical analysis, so that's the sense in which I am divorcing that from how you figure out that value is $100 per household.

Q. (BY MR. JORGENSEN) I appreciate your point. So in my hypothetical, just to make sure, we would apply that principle so that $100 would not be the highest point, but rather would be the point that you would arrive at in the same method you arrived at in the work you did in the case?

A. Yes.

Q. Okay. So then the ultimate answer for

your report using this method would be 10 billion?

MS. XIDIS: Objection to form.

A. As I understand the hypothetical that we have been talking about, the answer is yes.

Q. (BY MR. JORGENSEN) Dr. Hanemann, did you include any Arkansas residents in your work in this case?

A. I don't believe we did.

Q. Why not?

A. We restricted the survey, the sample frame to households in Oklahoma.

Q. I apologize, but for the record, you have to do it this way. Dr. Hanemann, did you include any Missouri or Kansas residents in your work in this case?

A. The answer is the same, no.

Q. Dr. Hanemann, do you know whether the residents of Arkansas, Missouri, and Kansas use the Illinois River Watershed?

A. I don't have specific information in front of me as I sit here and now, but I wouldn't be surprised if those residents of those states -- some residents from those states sometimes visit the Illinois River Watershed.

Q. I believe you previously mentioned that

17:48:13 1 the western counties of Oklahoma that were excluded
17:48:15 2 from your work in this case are primarily rural?
17:48:18 3 A. That's my understanding, yes.
17:48:20 4 Q. Would the rural versus urban background
17:48:22 5 of a respondent have the potential to influence their
17:48:26 6 answer to your questions?
17:48:30 7 A. It may be something that influences
17:48:35 8 assessment of the watershed or it may not be. That's
17:48:37 9 an empirical question.
17:48:39 10 Q. Could the fact that someone has a rural
17:48:41 11 background cause them to be more skeptical of the
17:48:45 12 claimed injuries in this case?
17:48:46 13 MS. XIDIS: Objection to form.
17:48:46 14 A. I don't know.
17:48:48 15 Q. (BY MR. JORGENSEN) Did you make any
17:48:50 16 effort to determine whether excluding the residents of
17:48:54 17 western Oklahoma from your work impacted the answer
17:49:03 18 that you got in this case?
17:49:05 19 A. We know it did. It lowered it, because
17:49:05 20 we imputed a value of zero to them.
17:49:09 21 MR. JORGENSEN: This one is really for
17:49:20 22 Claire, actually. Let me clarify with you. Let me
17:49:33 23 say this on the record. Ms. Xidis, I believe earlier
17:49:37 24 today the witness was shown several excerpts from an
17:49:41 25 Oklahoma Tourism Handbook, and I believe he testified

that he obtained either through purchase or gift this handbook and looked through it. I don't think we have the full handbook. Can we get the rest of it from you?

MS. XIDIS: Submit it in a request.

MR. JORGENSEN: This is the request.

MS. XIDIS: Put it in writing. You've all had this since January 5. If you-all thought you were missing something, there have been plenty of opportunities to ask about it.

Q. (BY MR. JORGENSEN) Dr. Hanemann, is it true that you, as part of your work in this case, obtained a tourism handbook?

A. Yes.

Q. Is it true that you looked through it?

A. Yes.

Q. Is it true that you made copies of certain components of it?

A. Yes.

Q. Do you still have that book?

A. I believe I do.

Q. Okay.

A. I mean, let me emphasize. I'm not sure. Sometimes books go -- wander off, but as far as I know. And the second caveat I should mention is that

my study is phenomenally cluttered and so locating any individual item is not always easy.

Q. I understand.

MS. XIDIS: It seems to me also that it's been the practice that we are not having all of our experts produce all of their books in this case and this is something that you could get from a library and is publicly available.

MR. JORGENSEN: I'm not sure that I could, because the title is not stated on any particular page and Dr. Hanemann testified that he looked through it.

A. You know, I'm pretty sure I got it from bestwebbuys.com, but I thought the title --

MR. JORGENSEN: Oh, no. Here it is. I'm sorry. The title is stated here. Well, I still think it's your obligation to produce everything that he looked through and considered, and so I'm making a request for this book.

MS. XIDIS: Is it your position that the standard in this case is that any book that any expert considered should be produced?

MR. JORGENSEN: No. I just want this book.

MS. XIDIS: I'll see if we can find it.

17:51:39 1 MR. JORGENSEN: Thank you.
17:51:41 2 Q. (BY MR. JORGENSEN) Dr. Hanemann, I
17:51:43 3 believe -- let me strike that.
17:51:45 4 Dr. Hanemann, did you previously testify
17:51:46 5 that it was your opinion that the injuries in this
17:51:50 6 case resonated with the people who participated in the
17:51:54 7 focus groups?
17:52:00 8 A. I testified that I was struck that it
17:52:05 9 resonated with many of them.
17:52:07 10 Q. How many?
17:52:07 11 A. I can't tell you.
17:52:07 12 Q. Ten?
17:52:09 13 A. Oh, I can't tell you both how many people
17:52:15 14 were in the focus groups I observed, but it struck me
17:52:16 15 that it resonated with a fairly high percentage, but I
17:52:22 16 can't be more precise than that.
17:52:22 17 Q. And how did they show that it resonated
17:52:24 18 with them?
17:52:26 19 A. By things that they said.
17:52:28 20 Q. Like what?
17:52:30 21 A. I can't give you a specific example.
17:52:33 22 Q. If you noted that it resonated with some
17:52:35 23 people, that means it did not resonate with other
17:52:37 24 people; is that right?
17:52:39 25 A. Some people confirmed this because it

17:52:43 1 jibed with their experience. Other people didn't say
17:52:46 2 anything, but there could have been two reasons: It
17:52:48 3 was inconsistent with their experience or they hadn't
17:52:52 4 visited, for example, the river in the past, so they
17:52:54 5 had no experience or no opinion to offer about whether
17:53:00 6 it was different now than before. That's my sense.
17:53:05 7 Many of the people had been there before that sort of
17:53:09 8 confirmed this change.
17:53:09 9 Q. And of the two options you just presented
17:53:11 10 that perhaps the people disagreed -- the people who
17:53:15 11 were silent disagreed with your description of the
17:53:16 12 injury or that they may not have had any experience,
17:53:20 13 you don't know which reason motivated them?
17:53:24 14 A. No. I mean, my impression is that there
17:53:28 15 was not statement of disagreement. There was
17:53:31 16 silence -- people who had been -- not -- I mean, not
17:53:37 17 necessarily all, but many of the people who had been
17:53:41 18 there said yes. I don't recall people saying no, no,
17:53:43 19 it's not like that; it didn't change that way.
17:53:46 20 Q. So some people said yes, they agreed with
17:53:48 21 your statement of the injury?
17:53:50 22 A. Some people said yes, I have noticed this
17:53:52 23 change.
17:53:52 24 Q. And other people said nothing?
17:53:54 25 A. Yes.

17:53:54 1 Q. And other people who said nothing, it's
17:54:01 2 possible that they disagreed with your statement; you
17:54:03 3 don't know?
17:54:05 4 A. I don't know. I mean, this in the
17:54:05 5 context where people were encouraged to talk and we're
17:54:09 6 talking, but if they stayed silent for some motive,
17:54:15 7 which was not the norm, I wouldn't know that.
17:54:18 8 Q. Is it true that you -- strike that.
17:54:22 9 Did you tailor your description of the
17:54:26 10 injury over time?
17:54:30 11 A. You have the various descriptions; that
17:54:35 12 is, you have the many texts, and the text evolved and
17:54:39 13 changed, and you'll have that information as to how it
17:54:45 14 changed.
17:54:46 15 Q. So is your testimony today about how many
17:54:48 16 people responded to the description of the injury
17:54:50 17 based on your general impressions and memory?
17:54:52 18 A. Yes.
17:54:52 19 Q. If the documents from Stratus' work show
17:55:00 20 that people disagreed with your descriptions of the
17:55:01 21 injury, you aren't contradicting those documents here,
17:55:03 22 are you?
17:55:05 23 A. I'm describing my general impression, so
17:55:09 24 it would depend what exactly those documents showed.
17:55:13 25 Q. So it's possible that Stratus has

documents about respondents' statements that are incorrect?

MS. XIDIS: Objection to form.

A. All of the documents that Stratus has have been turned over, and I'm not quite sure of the question, what the question was.

Q. (BY MR. JORGENSEN) Do you have any reason to believe that the notes or documents that Stratus took from the focus groups are in any way incorrect?

A. Stratus -- individuals took notes. And do I have reason to believe that people took notes which misrepresented what they perceived -- I mean what they saw happening? I have no reason to believe that they would misrepresent that. Is it possible that people seeing the same thing as me reached a different conclusion? That's possible, but that's speculation.

Q. In economic theory, would you agree that there is sometimes a difference between what people say they are willing to pay for something and what they are actually willing to pay?

A. It's not a matter of economic theory. This is an empirical question whether that difference exists.

17:56:41 1 Q. In your experience, is there a difference
17:56:43 2 between what people sometimes -- strike that.
17:56:45 3 In your experience, is there sometimes a
17:56:46 4 difference between what people say they are willing to
17:56:48 5 pay for something and what they are really willing to
17:56:52 6 pay?
17:56:52 7 MS. XIDIS: Objection to form.
17:57:05 8 A. The answer is I'm not sure.
17:57:11 9 Q. (BY MR. JORGENSEN) Would you agree that
17:57:13 10 if a water body is polluted, people are less likely to
17:57:15 11 use it?
17:57:16 12 MS. XIDIS: Objection to form.
17:57:20 13 A. I'm not sure. It really depends on the
17:57:24 14 nature of the pollution and also the type of use that
17:57:28 15 we are talking about.
17:57:30 16 Q. (BY MR. JORGENSEN) Would you agree that
17:57:31 17 if a water body is polluted, people are less likely to
17:57:33 18 drink it, the water?
17:57:35 19 MS. XIDIS: Objection to form.
17:57:37 20 A. Again, this is an empirical question and
17:57:45 21 an issue that would be if people are aware that the
17:57:46 22 water is polluted, but I would speculate that people
17:57:50 23 would be less likely to drink water that they knew to
17:58:00 24 be polluted, but it depends on the pollutant and on
17:58:03 25 the people.

17:58:03 1 Q. (BY MR. JORGENSEN) To your point about
17:58:05 2 what people know, would you agree that if the
17:58:07 3 pollution in a water body is aesthetically unpleasant,
17:58:09 4 people are less likely to use it?
17:58:13 5 MS. XIDIS: Objection to form.
17:58:15 6 A. My impression is, again, this depends on
17:58:18 7 uses, and certain uses would be -- could be affected
17:58:24 8 and other uses not, and water contact uses are likely
17:58:30 9 I think to be affected, but a noncontact use like
17:58:31 10 boating might not be affected.
17:58:35 11 Q. (BY MR. JORGENSEN) Are you an expert in
17:58:37 12 recreational water use?
17:58:41 13 A. It depends how you define this. I
17:58:45 14 personally do not engage extensively in recreational
17:58:48 15 water use. Over the course of my career, I have
17:58:54 16 participated in many studies which involved the
17:58:54 17 analysis of recreational water use, and so I've both
17:59:03 18 interviewed many people and read many books, and so I
17:59:07 19 have a knowledge, but it's a knowledge of other
17:59:13 20 people. It's a knowledge of books. It's not about a
17:59:15 21 knowledge based on my own personal participation in
17:59:18 22 recreation.
17:59:20 23 Q. Do you hold yourself out as an expert in
17:59:22 24 the factors that cause people to use or not use a
17:59:24 25 water body?

17:59:26 1 MS. XIDIS: Objection to form.
17:59:26 2 A. I have expertise on those factors for
17:59:30 3 some water bodies.
17:59:30 4 Q. (BY MR. JORGENSEN) What is your training
17:59:31 5 in that?
17:59:33 6 A. My expertise has come not from formal
17:59:35 7 training, but from having studied this, conducted
17:59:39 8 interviews, surveys with people over the years. And
17:59:46 9 let me emphasize, my career started off in 1974 doing
17:59:50 10 a landmark study of how people reacted to and were
18:00:00 11 affected by water pollution in Boston Harbor, so
18:00:03 12 that's 35 years ago this summer, and so I've continued
18:00:07 13 to come back to this topic.
18:00:09 14 Q. In your answers today, Dr. Hanemann, did
18:00:13 15 you say there have been major changes in the
18:00:13 16 environment of the IRW?
18:00:16 17 MS. XIDIS: Objection to form.
18:00:18 18 A. Yes, or at least you have the specific
18:00:20 19 statement that I made earlier today.
18:00:22 20 Q. (BY MR. JORGENSEN) Okay. I'll ask it a
18:00:22 21 different way because of your client's -- your
18:00:24 22 counsel's objection.
18:00:24 23 To your knowledge, have there been major
18:00:28 24 changes in the environment of the IRW?
18:00:33 25 A. I would like to be precise as to -- I am

18:00:43 1 referring to changes of the sort described in the
18:00:48 2 survey on pages A-8, A-9 and A-10 and A-11.
18:01:03 3 Q. Of the changes described on pages A-8
18:01:05 4 through A-11, do you have any personal knowledge of
18:01:07 5 those changes?
18:01:09 6 A. No, I don't.
18:01:11 7 Q. How do you obtain your knowledge of those
18:01:13 8 changes?
18:01:15 9 A. My knowledge comes from -- the primary
18:01:18 10 knowledge comes from the natural scientists working
18:01:24 11 for the State of Alaska -- excuse me. I must be
18:01:28 12 tired -- the State of Oklahoma and, as I said, was
18:01:31 13 confirmed anecdotally by comments in focus -- by
18:01:35 14 participants in focus groups that I have observed.
18:01:37 15 Q. In light of that, do you have -- do
18:01:39 16 you -- let me start over again.
18:01:41 17 Dr. Hanemann, do you have any expert
18:01:45 18 opinion about whether there have been any changes in
18:01:46 19 the environment of the IRW?
18:01:48 20 A. No, that's not a topic on which I am
18:01:52 21 offering. I am offering an opinion on the economic
18:01:54 22 value of those changes, but I'm not offering an
18:01:54 23 opinion on the magnitude of the injuries.
18:02:11 24 Q. Is contingent valuation the only way to
18:02:13 25 value a public good?

18:02:16 1 A. Yes.
18:02:24 2 Q. A public good cannot be valued by any
18:02:28 3 other method?
18:02:31 4 A. I'm not aware -- well, I mean, other than
18:02:35 5 having actual referendum that would generate a value.
18:02:45 6 Q. To your knowledge, did anyone from the
18:02:46 7 state collect any money from the people who said in
18:02:52 8 response to your survey that they were willing to pay?
18:03:00 9 A. To my knowledge, the state has not
18:03:03 10 collected money from those survey respondents.
18:03:05 11 Q. So to date, the willingness of those
18:03:09 12 people -- excuse me. Let me start over again.
18:03:11 13 So to date, the expressed willingness of
18:03:13 14 those people to pay is entirely hypothetical?
18:03:16 15 MS. XIDIS: Objection to form.
18:03:18 16 A. Let me remind you that the object of this
18:03:22 17 exercise, of the valuation, is not actually to have
18:03:28 18 the people of Oklahoma pay for the restoration. The
18:03:31 19 issue in the litigation is to have the responsible
18:03:35 20 parties pay for the litigation.
18:03:37 21 Q. (BY MR. JORGENSEN) So --
18:03:39 22 A. Pay for the injuries, excuse.
18:03:41 23 Q. So, Dr. Hanemann, neither you nor anyone
18:03:43 24 who worked for the state accepted donations of the
18:03:45 25 amount to verify that the people were actually willing

to pay?

A. I don't know that donations were offered. That was not within the context of the survey. So I don't know whether survey respondents offered donations to the state. I don't know whether the state has accepted donations from those respondents or from anybody else.

Q. And to your knowledge, did the state solicit those donations?

A. I have no knowledge about what activities the state did.

Q. The respondents who participated in your work were informed that this was a survey; is that correct?

A. Yes.

Q. Do you know how taxes are set by the state government of Oklahoma?

A. I know that they are set by the legislature.

Q. Did you do anything to suggest to the respondents that taxes would be set in any other than the usual way?

MS. XIDIS: Objection to form.

A. The -- what we informed respondents is that the state would impose -- would require a

18:05:15 1 one-time tax payment. We didn't specify the
18:05:18 2 circumstances under which the state would do that, and
18:05:22 3 people took this, I think, as a -- people believed
18:05:26 4 this statement.
18:05:28 5 Q. (BY MR. JORGENSEN) To your knowledge,
18:05:30 6 Dr. Hanemann, is the way that the state of Oklahoma
18:05:31 7 sets its taxes a public process whereby the interest
18:05:35 8 of all the voters are considered in a representative
18:05:37 9 fashion?
18:05:39 10 MS. XIDIS: Objection to form.
18:05:41 11 A. I guess I'm not sure.
18:05:45 12 Q. (BY MR. JORGENSEN) To your knowledge,
18:05:45 13 Dr. Hanemann, are all of the competing interests of
18:05:48 14 the public factored into the political process of
18:05:50 15 setting taxes in the state of Oklahoma?
18:05:54 16 MS. XIDIS: Objection to form.
18:05:54 17 A. I don't know.
18:06:00 18 Q. (BY MR. JORGENSEN) Dr. Hanemann, do you
18:06:00 19 know whether taxes are ever proposed in Oklahoma that
18:06:01 20 are not ultimately enacted?
18:06:03 21 MS. XIDIS: Objection to form.
18:06:05 22 A. I don't know.
18:06:07 23 Q. (BY MR. JORGENSEN) Dr. Hanemann, did you
18:06:07 24 or anyone else working for the state do anything to
18:06:11 25 dissuade the respondents from the belief that the

normal factors that go into setting taxes in Oklahoma would be in play in the setting of the taxes mentioned in your survey?

MS. XIDIS: Objection to form.

A. If you are asking did we do anything to dissuade people from not believing the scenario we presented, we worked on the language to the point where people believed that. The notion that this could not be because that's not how taxes were set was not something I heard raised in focus groups, and so I don't believe that emerged as an issue. Had it been, I'm sure we would have paid attention to that and developed language to deal with it.

Q. (BY MR. JORGENSEN) So you did not develop any language to inform the respondents that the tax-setting process here would be different than the normal tax-setting process?

MS. XIDIS: Objection to form.

A. This is an issue that wasn't raised and therefore we didn't develop language to deal with an issue that wasn't an issue.

Q. (BY MR. JORGENSEN) To the extent the respondents in a survey such as yours have preexisting biases, can those biases affect their answers to the survey?

MS. XIDIS: Objection to form.

A. I'm not sure what you mean by "bias," But let me answer it this way: People bring attitudes, opinions, expectations to a survey as they do to other decisions they are asked to make, and those attitudes and opinions are likely to influence, but -- I mean, whether they do and the amount they do depends on the particular attitude or opinion and the particular issue that's involved.

Q. (BY MR. JORGENSEN) A minute ago, Dr. Hanemann, I believe you testified that the point of your work in this case is to try to hold the parties responsible for any alleged pollution liable; is that correct?

MS. XIDIS: Objection to form.

A. I would word it a little differently. It's not the point of my work. My understanding is that the purpose of the litigation is to hold the parties -- the responsible parties liable.

Q. (BY MR. JORGENSEN) Would a well-designed survey instrument seek to avoid triggering any biases that the respondents may have against the defendant against whom the survey results will be used?

MS. XIDIS: Objection to form.

A. If there was perception -- let me just

back up. I don't think there was any evidence that people saw this as something that would be used against the poultry industry for several reasons. We emphasized that while the poultry industry would make some payment, the bulk of the payment wouldn't come from the poultry industry, it would come from the people of Oklahoma. So if they had an animus against the poultry industry, for example, if they wanted to sock it to the poultry industry, it would be very strange if they had ever said they would want to tax themselves a higher amount because of the animus against the poultry industry.

Q. (BY MR. JORGENSEN) I appreciate what you said, Dr. Hanemann, but I believe my question was: Would a well-designed survey instrument seek to avoid triggering any biases that the respondents have against the defendant against whom the survey results will be used?

MS. XIDIS: Objection to form.

A. This is something that was addressed by the NOAA panel, and let me see if I can -- I believe what we did was very much in compliance with the NOAA panel, but I would prefer to use their language.

Q. (BY MR. JORGENSEN) And, Dr. Hanemann, go right ahead. You can give whatever answer you want,

but just to clarify, my question is not what the NOAA panel said. My question is -- you go ahead with your answer and then I'll repeat my question.

A. So the NOAA panel said that the survey should be designed to deflect dislike of big business away from the environmental program that is being evaluated, and I agree with that, and I believe we did that effectively in this instrument.

Q. So, Dr. Hanemann, would a well-designed survey instrument seek to avoid triggering any biases that the respondents have against the defendant against whom the survey results will be used?

MS. XIDIS: Objection to form; asked and answered.

A. In this -- let me just emphasize. I guess the short answer is not necessarily in this context.

Q. (BY MR. JORGENSEN) To the extent that survey respondents in their own minds were seeking to punish a defendant in litigation, would that skew the results of the survey?

MS. XIDIS: Objection to form.

A. If a respondent answered the survey with the motivation of punishing the poultry industry or whatever, that would influence -- that could influence

18:11:39 1 the person's response. There is no evidence that that
18:11:45 2 phenomenon was a factor here.
18:11:50 3 Q. (BY MR. JORGENSEN) Dr. Hanemann, would
18:12:18 4 you agree that surveys are sensitive to the nuance and
18:12:22 5 context of the person who is administering the survey?
18:12:31 6 A. Not necessarily. It depends on both the
18:12:35 7 survey and how well trained the interviewer who is
18:12:35 8 administering the survey is.
18:12:39 9 Q. And so in light of that answer, would you
18:12:39 10 disagree that discrepancies from nuance and context
18:12:46 11 cannot entirely be ruled out in a survey?
18:12:52 12 A. I'm not sure what you mean by "nuance and
18:12:54 13 context." Of the instrument? Of the interviewer?
18:13:01 14 Q. Let me say it like this: Would you agree
18:13:03 15 that one cannot avoid the fact that surveys are
18:13:05 16 sensitive to nuance -- let me start it over again.
18:13:11 17 Dr. Hanemann, would you agree that one
18:13:13 18 cannot avoid the fact that surveys are sensitive to
18:13:15 19 nuance and context and are bound by the constraints of
18:13:20 20 human cognition?
18:13:22 21 A. That's compound. I'll agree that surveys
18:13:26 22 are bound by the constraints of human cognition.
18:13:30 23 Q. But you will not agree that they are
18:13:30 24 sensitive to nuance and context?
18:13:33 25 A. They may or may not be, and the person

you should put that question to is Dr. Tourangeau or Dr. Krosnick because they have far more experience and also specific expertise on that topic.

Q. Dr. Hanemann, is there disagreement in the scientific community regarding whether contingent valuation is a scientifically sound method?

A. I don't think when you say "the scientific community," there is a discussion of that.

Q. So is your answer to my previous question no?

A. I'm not aware of discussion in the scientific community on contingent valuation.

Q. Just to be clear, you are not aware of any discussion in the scientific community on any topic about contingent valuation or you're not aware of any discussion in the scientific community about whether or not it's a scientifically sound method?

A. Well, two things: Perhaps you can define scientific community for me because --

Q. Is there a group of scientists in the United States who you consider your peers?

A. If you are asking any economists, that would narrow things down. There are some scientists who don't regard economists as scientists, so I think it would be simpler to talk about economists, so if

you would like to rephrase the question.

Q. You bet. Dr. Hanemann, is there some disagreement among economists regarding whether contingent valuation is a scientifically sound method?

A. Actually, I don't think the term "scientifically sound" is a term of art used in economics, and so I can't answer your question because that's not a term of art in economics.

Q. Dr. Hanemann, is there some disagreement among economists about whether contingent valuation is a reliable measure of the value of a public good?

A. You mean as a generalization regardless of how it's conducted or regardless of any details?

Q. Initially, yes.

A. I don't know if some economists or some people have that attitude. I don't think it's a well-supported attitude. It's not reflected in the mainstream view of economics or in environmental economics. It's not supported by the NOAA panel and it's also not a view that I think I would subscribe to.

Q. You yourself are a proponent of contingent valuation, are you not?

MS. XIDIS: Objection to form.

A. I had this discussion in Australia. I'm

not a proponent of one or another method of valuation. I am a researcher, I'm a scholar, I study these issues. My experience and my knowledge leads me to the conclusion that there is not a magic wand; that you cannot make a generalization saying demand analysis always works or demand analysis never works or contingent valuation always works or conjoint analysis always works. That's in my view unscientific; that is, it's a statement -- it's an ideological position regardless of facts.

Q. Do you know who Dr. Diamond is?

A. I know who Professor Diamond is.

Q. Who is Professor Diamond?

A. He is a professor of economics at MIT.

Q. Are you ware of any of his opinions about contingent valuation?

A. Yes.

Q. Does he question the reliability of contingent valuation?

A. Yes. I want to mention one thing. Both he and I testified in August 1992 to the NOAA panel, and the NOAA panel rejected his recommendations and endorsed mine; that is, if you look at the specific testimony that he offered them and if you look at the specific language I did, there were others, the NOAA

panel came closest to language that I used in my recommendations than to any of the two dozen other people presenting on that occasion.

Q. Has Dr. Diamond, to your knowledge, received any awards?

A. He has received many awards for his work on other topics.

Q. Is he well-respected in the scientific community?

A. I don't know that the scientific community knows him.

Q. Do you respect Dr. Diamond?

A. I respect his -- some of his work on the economics of Social Security.

Q. But you do not respect his work on contingent valuation?

A. I don't respect the papers that he wrote that I have seen on this topic.

Q. Do you know who Dr. Hausman is?

A. I do.

Q. Who is Dr. Hausman?

A. He is a professor of economics at MIT.

Q. Does Dr. Hausman agree with your views on contingent valuation?

A. I don't know.

18:19:28 1 Q. Has Dr. Hausman criticized the
18:19:31 2 reliability of contingent valuation?
18:19:33 3 A. He has on some occasions.
18:19:35 4 Q. Do you agree with Dr. Hausman's views
18:19:37 5 about the reliability of contingent valuation?
18:19:39 6 A. Perhaps you could point me to a specific
18:19:41 7 document and I'll respond.
18:19:43 8 Q. Are you aware of any views that
18:19:45 9 Dr. Hausman holds with which you disagree?
18:19:52 10 A. I don't know what he -- I don't know what
18:19:54 11 views he holds now. I have seen views that he
18:20:00 12 expressed recently on the use of -- on valuing market
18:20:07 13 goods, and I actually agree with his strict use in
18:20:11 14 that case, but I don't believe they apply to public
18:20:15 15 good in a voting format.
18:20:16 16 Q. Is Dr. Hausman well-respected in the
18:20:16 17 scientific community?
18:20:18 18 A. He is well-respected as the developer of
18:20:22 19 certain econometric estimators.
18:20:24 20 Q. Do you respect Dr. Hausman's work?
18:20:28 21 A. I respect his work and the development of
18:20:30 22 certain econometric estimators.
18:20:31 23 Q. Do you respect his work with regard to
18:20:33 24 contingent valuation?
18:20:35 25 A. No.

18:20:37 1 Q. Do you know Professor Milgrom?
18:20:39 2 A. Yes.
18:20:39 3 Q. Who is Professor Milgrom?
18:20:41 4 A. Professor Milgrom is a professor at
18:20:41 5 Stanford University.
18:20:43 6 Q. Does Professor Milgrom share your views
18:20:46 7 on contingent valuation?
18:20:48 8 A. I don't know what his views are today.
18:20:54 9 Q. Has Dr. Milgrom ever expressed views
18:21:00 10 criticizing the reliability of contingent valuation?
18:21:03 11 A. Yes.
18:21:03 12 Q. Do you agree with those views?
18:21:07 13 A. You know, you would have to remind me of
18:21:09 14 the particular paper, but I think I disagree with the
18:21:18 15 views he expressed in, for example, the book edited by
18:21:22 16 Dr. Hausman.
18:21:24 17 Q. Is Dr. Milgrom well-respected in the
18:21:26 18 scientific community?
18:21:28 19 A. I don't know that he is known in the
18:21:30 20 scientific community. I think among economists he is
18:21:33 21 respected for some of his work on options, for
18:21:35 22 example.
18:21:35 23 Q. Has Dr. Milgrom won any awards of which
18:21:39 24 you are aware?
18:21:41 25 A. I don't know, but -- I don't know.

18:21:45 1 Q. Has Dr. Hausman won any awards of which
18:21:48 2 you're aware?
18:21:48 3 A. The John Bates Clark Medal.
18:21:50 4 Q. Is that a significant award?
18:21:54 5 A. It's a significant award for a young
18:22:00 6 researcher.
18:22:01 7 Q. Do you know Dr. Desvousges?
18:22:05 8 A. I know Dr. Desvousges. I have known him
18:22:07 9 for a long time.
18:22:07 10 Q. Who is Dr. Desvousges?
18:22:07 11 A. He is the gentleman sitting to your left.
18:22:13 12 Q. Does Dr. Desvousges -- strike that.
18:22:15 13 Has Dr. Desvousges expressed any opinions
18:22:16 14 about the reliability of contingent valuation?
18:22:20 15 A. Yes.
18:22:22 16 Q. Do you agree with all Dr. Desvousges'
18:22:24 17 opinions on that subject?
18:22:26 18 A. Well, Dr. Desvousges had different
18:22:28 19 opinions prior to the spring of 1989 and after the
18:22:31 20 spring of 1989. In the spring of 1989, he was going
18:22:33 21 to do a contingent valuation funded by Shell under my
18:22:39 22 direction. After the spring of 1989, he seemed to
18:22:43 23 have a change of heart about contingent valuation. I
18:22:46 24 think the summary is I agree with the old Bill
18:22:48 25 Desvousges, but not with the new Bill Desvousges.

18:22:52 1 Q. Is Dr. Desvousges well-respected in the
18:22:52 2 scientific community?
18:23:00 3 A. As I've said, I don't think he is known
18:23:01 4 in the scientific community. If you are referring to
18:23:05 5 economists, I think the answer would be probably not.
18:23:13 6 Q. Has Dr. Desvousges won any awards?
18:23:15 7 A. I don't know.
18:23:16 8 Q. In sum, Dr. Hanemann, all of the people
18:23:20 9 I've listed are academics with whom you disagree on
18:23:24 10 the reliability of contingent valuation?
18:23:28 11 MS. XIDIS: Objection to form.
18:23:28 12 A. Well, I have mentioned I agreed with
18:23:31 13 Dr. Desvousges, but he then changed his opinion. I
18:23:35 14 agree, as I've said, with some of Professor Hausman's
18:23:39 15 views on contingent valuation as expressed, but not
18:23:45 16 with others. And as I pointed out, the NOAA panel,
18:23:48 17 which consists of even more distinguished economists,
18:23:52 18 including two Nobel Prize winners, rejected the views
18:24:00 19 that they offered in August 1992, which are no
18:24:03 20 different from the -- which are the same as the views
18:24:07 21 you have cited. So I guess the answer to your
18:24:11 22 question is yes.
18:24:13 23 Q. Is it fair to say, then, that there is
18:24:13 24 disagreement among economists over the reliability of
18:24:16 25 contingent valuation?

18:24:20 1 A. I think that this is a little like
18:24:24 2 climate change. It's not the case that every last
18:24:26 3 scientist in the United States or elsewhere agrees on
18:24:33 4 climate change, but it's the case that the vast
18:24:35 5 preponderance of climate scientists agree. And I
18:24:41 6 would say there is, particularly since the NOAA panel,
18:24:43 7 a high level of acceptance of contingent valuation and
18:24:50 8 of stated preference in general.
18:24:52 9 Q. Do you know Dr. McFadden?
18:24:52 10 A. Yes.
18:24:54 11 Q. Who is Dr. McFadden?
18:25:00 12 A. He is a professor of economics at MIT --
18:25:03 13 at Berkeley. He was at MIT earlier.
18:25:07 14 Q. Has Dr. McFadden expressed doubts or
18:25:11 15 reservations about the reliability of contingent
18:25:15 16 valuation?
18:25:15 17 A. He expressed them at that same time in
18:25:16 18 '92 and '94.
18:25:18 19 Q. Do you disagree with the views that he
18:25:20 20 expressed?
18:25:26 21 A. Actually, you say has he expressed
18:25:28 22 reservations? He was considerably more measured than
18:25:35 23 some of the others in his discussion, so you would
18:25:39 24 actually -- I would -- before I could answer, I would
18:25:41 25 like to see what views you are referring to.

18:25:45 1 Q. Sitting here today, are you aware of any
18:25:45 2 views Dr. McFadden holds on contingent valuation of
18:25:50 3 which you are -- with which you disagree?
18:25:52 4 A. I'm not sure of what his views are and so
18:25:54 5 I'm not --
18:25:54 6 Q. Is Dr. McFadden well-respected in the
18:26:00 7 scientific community?
18:26:00 8 A. Very much so.
18:26:01 9 Q. Has Dr. McFadden won any awards?
18:26:03 10 A. He won the Nobel Prize.
18:26:05 11 Q. Do you know who Dr. Leonard is?
18:26:09 12 A. A little bit.
18:26:11 13 Q. Who is Dr. Leonard?
18:26:11 14 A. A sidekick of Jerry Hausman.
18:26:15 15 MS. XIDIS: Excuse me, Jay. I need to
18:26:15 16 interrupt. I honestly thought we would be done well
18:26:18 17 before now and I need to deal with something else I
18:26:20 18 had scheduled and take a break.
18:26:24 19 MR. JORGENSEN: Yeah, let's take a break.
18:26:24 20 Let's take a five-minute break.
18:26:26 21 THE VIDEOGRAPHER: Going off the record.
18:26:28 22 The time is 6:26.
18:33:00 23 (Recess taken, 6:26 p.m. to 6:34 p.m.)
18:26:28 24 THE VIDEOGRAPHER: Back on the record.
18:34:11 25 The time is 6:34.

18:34:15 MR. JORGENSEN: I have no further questions.

18:34:16 MS. XIDIS: Okay. No other questions? The witness will read and sign.

18:34:20 THE VIDEOGRAPHER: This marks the end of Tape 4 of 4. Going off the record. The time is 6:34.

WHEREUPON, the within proceedings were concluded at the approximate hour of 6:34 p.m. on the 5th day of May, 2009.

I, WILLIAM MICHAEL HANEMANN, do hereby certify that I have read the above and foregoing deposition and that the same is a true and accurate transcription of my testimony, except for attached amendments, if any.

Amendments attached ( ) Yes ( ) No

_____
WILLIAM MICHAEL HANEMANN

The signature above of WILLIAM MICHAEL HANEMANN was subscribed and sworn to before me in the county of _____, state of _____, this _____ day of _____, 2009.

_____
Notary Public
My commission expires

EXHIBIT F

REPORTER'S CERTIFICATE

STATE OF COLORADO)
) ss.
CITY AND COUNTY OF DENVER)

I, MARCHELLE HARTWIG, Certified Shorthand Reporter and Notary Public, State of Colorado, do hereby certify that previous to the commencement of the examination, the said WILLIAM MICHAEL HANEMANN was duly sworn by me to testify to the truth in relation to the matters in controversy between the parties hereto; that the said deposition was taken in machine shorthand by me at the time and place aforesaid and was thereafter reduced to typewritten form; that the foregoing is a true transcript of the questions asked, testimony given, and proceedings had.

I further certify that I am not employed by, related to, nor of counsel for any of the parties herein, nor otherwise interested in the outcome of this litigation.

IN WITNESS WHEREOF, I have affixed my signature this 15th day of May, 2009.
My commission expires April 19, 2013.

___X__ Reading and Signing was requested.

_____ Reading and Signing was waived.

_____ Reading and Signing is not required.